PrintSTEP

Plain Language Workbook

A printers' guide to environmental rules in N.H.




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New Hampshire Department of Environmental Services

SBTAP
SMALL BUSINESS TECHNICAL ASSISTANCE PROGRAM
New Hampshire Department Of Environmental Services

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PrintSTEP

PLAIN LANGUAGE WORKBOOK
A PRINTER'S GUIDE TO
ENVIRONMENTAL RULES IN N.H.

February 2002

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This document provides regulatory guidance to printers regarding waste water, storm water, hazardous waste, and air requirements. It includes a summary of the regulatory requirements for these waste streams as well as PrintSTEP specific requirements. The document is not a substitute for EPA's regulations, nor is it a regulation itself. Thus, it cannot impose legally-binding requirements on EPA, States, or the regulated community. The regulatory guidance was designed exclusively for use in the PrintSTEP pilots and may not be applied outside of the pilots. EPA may change this guidance in the future, as appropriate.

Table of Contents

Chapter 1:	What is PrintSTEP & How do I Participate	1-1
Chapter 2:	Pollution Prevention for Printers	2-1
Chapter 3:	Evaluating Wastewater Releases	3-1
Chapter 4:	Evaluating Stormwater Releases	4-1
Chapter 5:	Hazardous Waste Management	5-1
Chapter 6:	Evaluating Air Emissions: Volatile Organic Compounds (VOCs)	6-1
Chapter 7:	Evaluating Air Emissions: NH Regulated Toxic Air Pollutants (RTAPs)	7-1
Chapter 8:	Evaluating Air Emissions: Hazardous Air Pollutants (HAPs)	8-1
Chapter 9:	The PrintSTEP Application Process	9-1
Chapter 10:	What You Do Once You Are a PrintSTEP Participant	10-1
Chapter 11:	Building a Partnership with your Community	11-1
Chapter 12:	Occupational Safety & Health and Environmental Protection Programs	12-1

Appendices

Appendix A:	Technical Assistance Contacts	A-1
Appendix B:	Pollution Prevention Case Studies	B-1
Appendix C:	Additional Hazardous Waste Information	C-1
Appendix D:	PrintSTEP Air Levels: Materials Use Tables	D-1
Appendix E:	PrintSTEP Air Levels: Air Emissions Calculations	E-1
Appendix F:	List of NH Regulated Toxic Air Pollutants (RTAPs)	F-1
Appendix G:	List of Hazardous Air Pollutants (HAPs)	G-1
Appendix H:	Signs & Other Helpful Information	H-1
Appendix I:	PrintSTEP Application	I-1

CHAPTER 1:
What is PrintSTEP & How do I Participate?

New Hampshire Department of Environmental Services (NHDES)

The New Hampshire Department of Environmental Services (NHDES) is responsible for managing and enforcing environmental regulations in the state to protect the general public and state's natural resources. Printers and all other industries in NH are regulated by the NHDES.

Every printer in NH is legally required to comply with all NHDES environmental rules and regulations.

Benefits to New Hampshire Printers

PrintSTEP is a voluntary program that offers New Hampshire printers a simplified way to manage the complex environmental regulations that typically apply to this sector. Participating printers will receive practical guidance and free technical assistance on how to improve environmental performance and comply with NH DES environmental regulations. Other benefits include:

- This simplified workbook to assist you with compliance;
- A "short-form" approach to determining environmental status and applicable requirements saving time and resources;
- Reduced administrative costs;
- Reduced chance of inspection;
- Greater operational flexibility; and
- Real environmental improvements by implementing easy pollution prevent tips.

After completing the PrintSTEP process, New Hampshire printers will have demonstrated the items necessary to be considered "in-compliance" with the NHDES regulations. Participation in PrintSTEP will also decrease the chance of a DES enforcement inspection.

Pollution Prevention Tips

In addition to assisting with environmental compliance, this workbook will introduce pollution prevention tips that will do two things: save you money and improve your environmental performance. Pollution prevention reduces waste at the source, before it is generated. Pollution prevention tips will be presented throughout the environmental compliance chapters and in Chapter 2, *Pollution Prevention for Printers*.

Introduction to PrintSTEP

PrintSTEP, which stands for "Printer's Simplified Total Environmental Partnership," is a voluntary program being pilot tested in New Hampshire as well as two additional states, Missouri and Minnesota. PrintSTEP is a program that produces a single enforceable agreement between the printer and the NHDES that covers your regulations for wastewater, storm water, hazardous waste, and air emissions. PrintSTEP does not change any of the existing environmental regulations, but it simplifies and consolidates these regulations so you can run your business in a way that is cleaner, cheaper, and smarter.

- ⇨ **PrintSTEP combines environmental requirements for printing facilities into one system, administered by one agency, presented in this one *Workbook.*** Chances are, you currently need to deal with different kinds of environmental permits, paperwork, or approvals to conduct your business. Working with different agencies and different forms can be confusing and time-consuming. With PrintSTEP, your wastewater, stormwater, hazardous waste, and air requirements are all covered in one package. You only have one form to submit and one environmental agency contact.
- ⇨ **PrintSTEP promotes pollution prevention.** Pollution prevention means changing your processes to generate less pollution, instead of treating and disposing of it after it is created. This can save you money by using fewer resources and creating less waste. Through PrintSTEP, you will have access to free technical assistance to help you find ways to prevent pollution. PrintSTEP also encourages pollution prevention by highlighting how your regulatory requirements differ depending on your facility's overall releases. The less you release, the fewer the regulatory requirements.
- ⇨ **PrintSTEP incorporates public involvement.** Public involvement provides an opportunity for regulatory agencies, the printer, and the community to educate each other on their concerns and interests. Under the current regulatory system, the public may not be aware of printers' contributions to their communities, or their efforts to be environmentally responsible neighbors.
- ⇨ **PrintSTEP provides operational flexibility.** Normally, if you are making a change to your printing operations, such as adding a press, you have to notify the NHDES; however, when you make a process change under PrintSTEP, in many cases, no notification to NHDES is required. If the change does not result in a change in your PrintSTEP regulatory status, you can often make whatever changes are needed to respond to market demands without changing the PrintSTEP agreement or notifying the DES.

PrintSTEP Program Eligibility

- ⇨ Facilities where printing is the primary operation are eligible to participate in the PrintSTEP program.

- ⇨ Facilities where printing is an ancillary operation are **not** eligible for the PrintSTEP program.

- ⇨ Facilities that operate printing presses, but are "quick printers" are **not** eligible for the PrintSTEP program. Printing is not considered the *primary* operation at these facilities.

- ⇨ If you have any questions about your eligibility contact the PrintSTEP Coordinator at (603) 271-0683 or 1 888-270-0244 within New Hampshire.

How to Become a PrintSTEP Participant

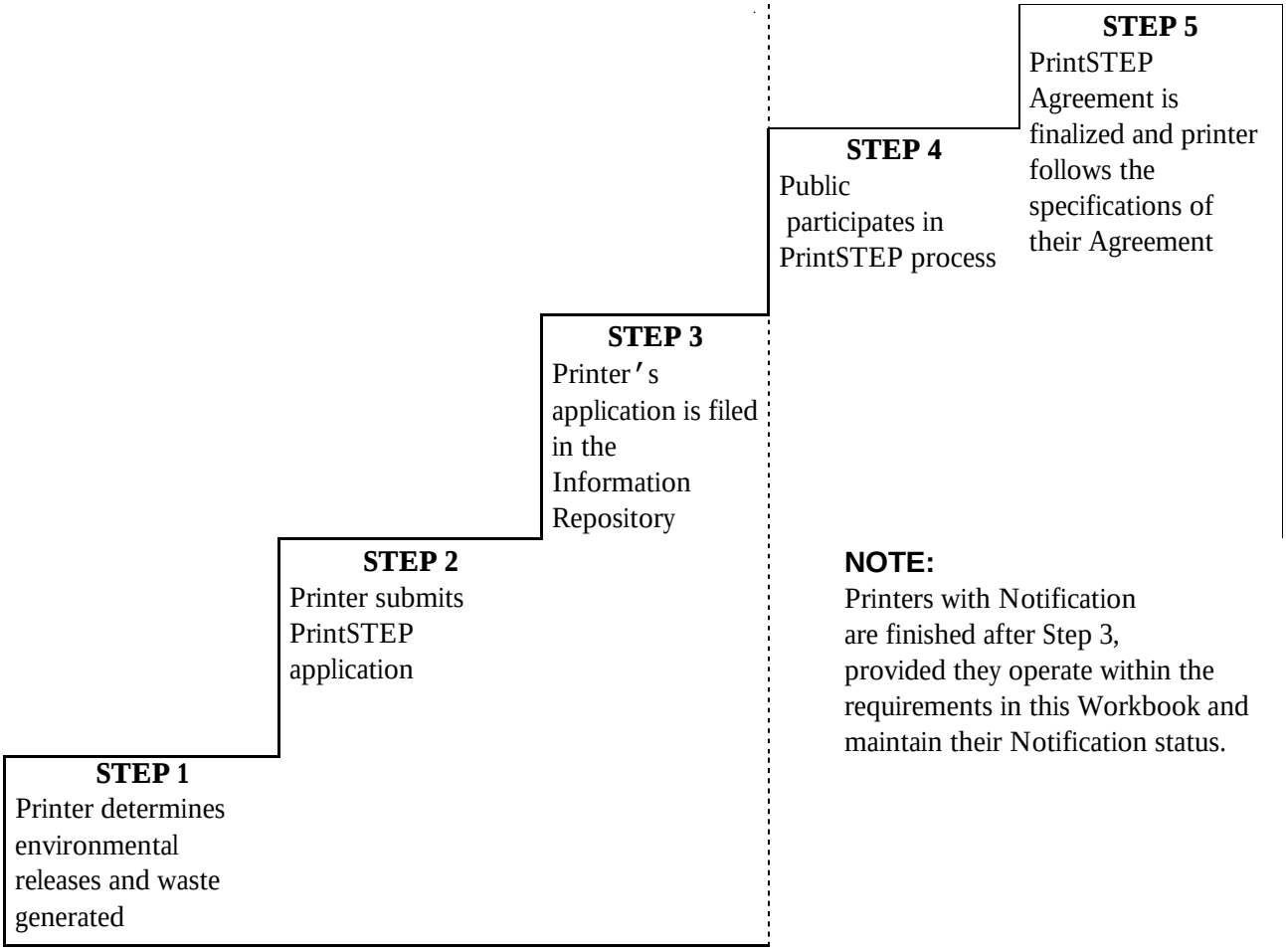
To become a PrintSTEP printer, you must first complete the enclosed PrintSTEP application. All the worksheets to prepare you for completing your application are in the chapters of this *Workbook*. The application itself is in Appendix I of this *Workbook*.

Figure 1 shows the basic process of participating in PrintSTEP. Printers who choose to participate will have their process wastewater, hazardous waste, storm water, and air requirements all covered under PrintSTEP -- there is no need to fill out multiple forms or make calls to NHDES. Read on to become a PrintSTEP printer yourself!

What You Will Need to Complete Your PrintSTEP Application

Most of the information you will need to complete the PrintSTEP application is already at your facility. This includes chemical purchasing records, material safety data sheets, and hazardous waste disposal information. MSDS sheets are provided by the manufacturer for every chemical product obtained by your vendor. You must obtain these from your vendor for each product you use. See example on Pg. 12-6. With this information and the PrintSTEP Workbook, you will be able to complete the PrintSTEP application.

Figure 1: The PrintSTEP Process



NOTE:

This Workbook describes the most significant regulations that typically apply to a printer's process wastewater, hazardous waste, storm water, and air emissions. However, be aware that the applicability of regulations depends on the particular processes and chemicals used in a facility. This Workbook was designed to cover the regulations for most printers, but there will occasionally be exceptions.

In PrintSTEP, Fewer Releases Mean Fewer Requirements

In PrintSTEP, your regulatory requirements depend on the quantity of emissions or wastes you generate. Fewer releases lead to fewer requirements. Those printers with the lowest releases and wastes will send in a simple PrintSTEP Notification. Printers with greater releases will get a PrintSTEP Agreement, as described below.

Most NH printers will fall into this category.

PRINTSTEP NOTIFICATION ➔

1. Your facility has a septic system and all industrial wastewater is shipped offsite ***OR*** You discharge less than 25,000 gpd process waste water to a POTW, ***OR*** you have no process waste water discharge ***AND***
2. You do not generate hazardous waste ***OR*** you're a Small Quantity Generator ***OR*** you're a Full Quantity Generator (<1000 kg/month) ***AND***
3. Your storm water is exempt from regulation ***AND***
4. Your VOC air emission is Level 1 or 2 ***AND***
5. Your RTAP Level is 1, ***AND***
6. Your HAP Level is 1.

- ⇨ Printers with the lowest environmental releases or wastes submit a simple PrintSTEP Notification.
- ⇨ Document your environmental releases/wastes and submit a PrintSTEP application, which the state files in a public Information Repository.
- ⇨ That's it! You are a PrintSTEP participant as long as you operate within the requirements and maintain your Notification Status.

PRINTSTEP AGREEMENT

- ✓ You discharge more than 25,000 gpd process waste water to a POTW, or require an individual NPDES permit ***OR***
- ✓ You're a Full Quantity Generator of hazardous waste (>1000 kg/month) ***OR***
- ✓ Your storm water is regulated ***OR***
- ✓ Your VOC emissions are Level 3, 4, or 5
- ✓ Your RTAP Level is 2, or
- ✓ Your HAP Level is 2 or 3.

⇨ Printers with greater environmental releases or wastes get a PrintSTEP Agreement, instead of a Notification.

⇨ Document your environmental releases/wastes and submit a PrintSTEP application, which the state files in a public Information Repository.

⇨ You work with the state and community to address concerns and develop the PrintSTEP Agreement which will include your regulatory requirements for process waste water, hazardous waste, storm water, and air.

⇨ When you receive your final PrintSTEP Agreement, you are then a PrintSTEP participant as long as you operate within the requirements in your Agreement.

PrintSTEP is Multi-media

PrintSTEP is a multi-media program, combining your requirements for process wastewater, stormwater, hazardous waste, and air emissions. Your regulatory requirements for each waste stream correspond to the magnitude of your releases related to that waste stream. The waste stream in the highest category determines whether you need a Notification or an Agreement, as shown in the example below.

An Example: ABC Printing Company

Waste Stream	Notification?	Agreement?
Waste water: they discharge less than 25,000 gal/day to a POTW	✓	
Hazardous waste: they are a small quantity generator	✓	
Storm water: they are exempt from storm water regulations	✓	
Air: moderate air emissions (VOC Level 3)		✓

✓ Even though ABC Printing qualifies for Notification based on 3 of the 4 waste streams, they still must apply for a PrintSTEP Agreement because of their VOC emissions. While the PrintSTEP Agreement will cover all 4 waste streams, it will list the same requirements as a Notifier would have for wastewater, hazardous waste, and storm water.

Next Step: Determining Environmental Releases

Before completing a PrintSTEP application, you must first do the following:

✓ determine your environmental releases for process wastewater, stormwater, hazardous waste, and air emissions.
✓ determine the corresponding regulatory categories.
✓ determine your corresponding regulatory requirements for each waste stream.

Chapters 2-9 will guide you through this process.

Public Involvement

Under PrintSTEP, each environmental release will determine the amount of public participation involved with the process. ***Most printers will only require a PrintSTEP Notification where public participation will only include storing your Notification in a local Information Repository.***

Public Involvement Requirements Worksheet

check your status in each row	**NO Public Involvement**	**LIMITED Public Involvement**	**FULL Public Involvement**
Waste Water	□ POTW discharges of <25,000 gal/day □ POTW, no discharges □ Septic System, no discharges	□ POTW discharges of >25,000 gal/day	□ NPDES Individual permit
Storm Water	□ NPDES General permit □ "No-Exposure"		
Hazardous Waste	□ no hazardous waste gen. □ . Small Quantity Generator □ Full Quantity Generator, less than 1000 kg/month	□ Full Quantity Generator, more than 1000 kg/month	
Air Emissions, VOC	□ VOC Level 1 □ VOC Level 2	□ VOC Level 3	□ VOC Level 4 □ VOC Level 5
Air Emissions, RTAP	□ RTAP Level 1	□ RTAP Level 2	

CHAPTER 2:
Pollution Prevention for Printers

What is Pollution Prevention?

This section of the *Workbook* presents pollution prevention information and actual case studies from printers who have reduced their wastes and emissions while improving their bottom line. Traditional methods of handling waste include treatment and disposal, while pollution prevention uses techniques that avoid the generation of waste and SAVE YOU MONEY.

What's in it for me?

More and more printers are finding it's better to prevent the generation of waste; if you don't generate it, there is nothing to treat or dispose. Big benefits to this approach include savings on raw materials, energy, and disposal costs and may include reduced emissions and regulatory requirements. Pollution Prevention (P2) can even increase the quality of your product (see the story of Graphic Printers, presented on page 2-5). By preventing pollution, you prevent waste problems before they can occur, including future liability problems. Case studies of pollution prevention projects that saved printers money are presented in Appendix B.

Pollution prevention generally involves some change; it might mean changing processes that you've used for a long time, or changing a solvent that has worked well for you. However, these changes can save you a lot of money, as well as decrease solvent emissions inside and outside your facility. You may even like the new product better than what you were using (as with Graphic Printers, page 2-5). P2 also includes energy efficiency (which reduces your electric bills) and using raw materials more efficiently, such as reducing solvent loss by decreasing evaporation.

To determine where the P2 opportunities are in your facility, you must first take a good look at your processes (see Appendix B). You may also be able to reduce waste through simple changes such as improved operating procedures or improved housekeeping. The NH Department of Environmental Services' Pollution Prevention Program (NHPPP) has developed a short, hands-on guide to help small businesses identify P2 opportunities at their

facilities. The guide, *Planning for Profits*, leads the reader through a six step process to reduce waste and save money at any type of manufacturing facility, including printing. Call NHPPP at 1-800-273-9469 to obtain a free copy.

Low Hanging Fruit

There are a number of P2 opportunities for printers that are inexpensive, quick and easy to do. Commonly referred to as "low hanging fruit," these simple projects are easy to implement and can start SAVING YOU MONEY right away. Some low hanging fruit P2 projects for all printers are bulleted below. Since the majority of printers in NH do lithographic, flexographic or screen printing, we have focused on opportunities for their processes. Once you have had success doing these types of projects you may want to investigate tackling a larger P2 project, such as investing in "direct-to-plate" technology to reduce make-ready waste.

One of the best ways any printer can "do P2" is to use solvents that have low vapor pressures. Solvents with vapor pressures of <10 millimeters of mercury are best. Using these types of solvents will reduce solvent evaporation, improve worker health and safety, and save you money from reduced solvent loss. You can work with your vendor for more environmentally friendly products. There are many good alternatives available.

For example, lithographic printers whose cleaning solvents contain toluene, generally have high vapor pressures. Switching to a solvent with less hazardous ingredients and lower vapor pressure (<10 millimeters of mercury) is a quick P2 project that will reduce solvents loss and emissions inside and outside your facility. This type of change may even lower your regulatory requirements.

General P2 Tips for all Printers[1]

- Keep solvents in appropriate covered containers to reduce solvent evaporation. Keep all quart size squirt bottles closed when not in use.

1) adapted from the Massachusetts Dept. of Environmental Protection

- Use gravity drainage (as simple as installing a grate in the bottom of the used rags container), wringers or an explosion proof centrifuge to recover solvent from your rags/wipes. Reuse the recovered solvent to clean press parts.
- Use dirty press wash for parts cleaning. Reuse or recycle all solvents to reduce purchase and disposal costs.
- Purchase a solvent distillation unit to significantly reduce solvent purchase and disposal. These units come in all sizes and can have a very quick payback.
- Keep flammable solvents in safety cans.
- Re-use packing material and scrap paper when possible for packaging materials (corner boards are a good example).
- Use silver recovery units to reduce silver concentrations in wastewater.
- Make one person responsible for chemical purchases and inventory control, and use a limited number of vendors.
- Track solvent and ink use and waste generation in order to target areas for waste reduction opportunities. Where can you save the most money?
- Use "first in- first out" management of raw materials to reduce waste from expired chemicals and other raw materials.
- Educate your employees about the importance of waste reduction and the associated cost savings – many employees do not realize how expensive raw materials are to purchase or how expensive waste is to dispose. Do your employees know how much solvent or ink costs? Do they know how much it costs to launder wipes?
- Give employees incentives to reduce waste generation and minimize chemical use. Employees often have good waste reduction ideas.
- Recycle as many items as possible; cardboard, metal, paper and plastic waste, waste negatives, printing plates, etc.

Lithographic Printers

- Use a *blanket wash* with vapor pressure <10 millimeters of mercury. See EPA's worksheet on Choosing a Better Blanket Wash at: www.epa.gov/dfe/lithography/bulletins/bullet04/lbulletin4.html.

- Consider using "stay open inks" that do not skin over, allowing them to remain in the press, which decreases solvent use and reduces start up time and labor costs.
- Use alcohol-free fountain solutions (most printers are already doing this).

See the detailed checklist of P2 opportunities for Lithographers on the Printer's National Environmental Assistance Center's (PNEAC) website: http://www.pneac.org/Sheets/litho/p2_cklist_litho.html.

Flexographic Printers

- Purchase correct size sheets and use correct amount of liquid based on film size to minimize use of unexposed photopolymer and save money.
- Consider switching to water washable plates to reduce solvent use.

The following case studies from PNEAC are recommended by the Flexographic Technical Association:

- Reducing Ink and Solvent Use in Enclosed Flexographic Ink Systems
- Management of Aqueous Waste from Water-Based Flexographic Printing Processes
- Environmental Management of Photopolymer Flexographic Printing Plates

These case studies are located at: http://www.pneac.org/sheets/flexo.

Screen Printers

- Clean screens while ink is still wet. Avoid delays in cleaning and reclaiming screens in order to reduce the amount of chemicals and labor needed to remove ink, emulsion and haze.
- Try increasing your water dilution for screen cleaning products to reduce chemical use and save money.
- Reuse shop towels to reduce ink remover use.
- Consider switching to water washable plates to reduce solvent purchase and disposal.

The following US EPA case studies and technical information are recommended by the Screenprinting & Graphic Imaging Association International:

- DfE Bulletin 1: Technology Alternatives for Screen Printing (technical information)
- DfE Bulletin 3: Work Practice Alternatives for Screen Reclamation

- DfE Case Study 2: Changing Equipment and Reducing Solvent Use in Screen Reclamation
- DfE Case Study 3: Innovations in Adhesives, Screen Cleaning, and Screen Reclamation.

These case studies can be found on US EPA's Design for the Environment (DfE) website at: http://www.epa.gov/opptintr/dfe/screenprinting/pubs.htm.

In addition, SGIA recommends this PNEAC case study:

- Improving on a Good Thing: Romo Reduces TRI Releases

This case study can be found at http://www.pneac.org/sheets/screen/romo.html.

NH Printer's Case Study

Printers right here in NH are using P2 techniques to reduce waste, save money, and improve their products. Here is one example of a simple project that saved a lithographic printer time and money.

Saving Money with Stay Open Inks

Graphic Printers is a small sheet fed, offset printing business with only six employees. The company won a 2000 Governor's Award for Pollution Prevention for switching from conventional solvent-based printing inks to "stay open" inks. These types of inks dry via chemical reaction with the paper, instead of solvent evaporation. These inks can be left in the presses for an indefinite period of time, reducing wash-up and loading time and solvent use. Graphic Printers saved an estimated $5000 in cleanup costs, alone.

Graphic Printers worked with their vendor, F&F Inks of Salem, NH to find and implement the conversion to stay open inks. These inks do not skin over, eliminating this waste stream.
By implementing the conversion to "stay open" inks, Graphic Printers reduced their generation of waste ink and waste solvent by approximately 85 percent. Project benefits include reduced ink and solvent consumption, reduced hazardous waste disposal costs for both solvent and ink waste streams, and reduced labor costs. Additional benefits from this project were improved air quality and increased employee morale.

Jesse Kamien of Graphic Printers declares that this is the best drying ink he has ever used. He has used these inks on jobs using work and turn form, double-sided, cut and fold, in less than 2 hours. Mr. Kamien highly recommends these inks. Many ink vendors carry these types of inks.

Source: DES press release, 2000 Governor's Awards

More Information and Technical Assistance

Appendix B is designed to help you do P2 at your facility. Remember, P2 can save you money, help get your company into compliance, and improve the working environment inside your facility. Appendix B contains:

- **A Mini-P2 Guide** to identify P2 projects at your facility Environmental Cost Accounting to identify "hidden" costs of waste.

- **Case Studies** to give you real world examples of printers saving money with P2 projects.

The Case studies presented in Appendix B include:

Case Study #	Type of Printing	Topic	Page
1	All	Safer cleaners	B-2
2	ALL	Digital pre-press	B-11
3	All	Silver recovery	B-4
4	Flexo	Water based inks	B-5
5	Litho	Soy based inks	B-6
6	Screen	UV curable inks	B-6
7	Litho	Alcohol free fountain soln.	B-7
8	All	Ink recycling	B-7
9	All	Changing work practices	B-8

CHAPTER 3:

Evaluating Wastewater Releases

The **CLEAN WATER ACT** (CWA) regulates discharges of pollutants to waters in the U.S. The CWA makes it unlawful for any person or facility to discharge any pollutant directly into navigable waters (unless a National Pollutant Discharge Elimination System (NPDES) permit is obtained). Most printers discharge their process waste water to their local sewer system, which in turn is managed by their local sewage treatment plant, called a **publicly owned treatment works** (POTW). The POTW sets minimum requirements for wastewater discharge, and treats wastewater before discharging it to surface waters. No NPDES permit is required if discharging to POTW.

Block off all Floor Drains

To ensure no chemicals are inadvertently discharged to either the sewer or a septic system, all floor drains should be closed off. This will prevent any inside spills from entering your water discharge system.

No Discharges to Septic System are Allowed

No industrial wastewater is allowed to be discharged to a septic system. Industrial wastewater includes rinsewater, developer, treated fixer, aqueous-based plate making chemistry, fountain solution, press wash water-buckets, etc. Only sanitary wastewater may be discharged to a septic system.

If you currently are discharging any industrial wastewater to a septic system, ***STOP IMMEDIATELY***. You are in violation of the Clean Water Act. Arrange to have all your industrial wastewater shipped offsite with a proper waste hauler.

Best Management Practices

See Table 2 at the end of this chapter for recommended wastewater best management practices for printing facilities.

Your Current Status

PrintSTEP defines wastewater as industrial process wastewater. It includes non-sanitary wastewater discharged from a particular point or pipe. It does not include wastewater from non-contact cooling, storm water, or sanitary systems. Check the box that corresponds to how you discharge your wastewater:

Check one:	Facility Wastewater Status	Go to here in this Workbook	Amount of Public Involvement
☐	Facility is connected to septic system, all industrial wastewater is shipped offsite	Chapter 3, Page 3-2	None
☐	Facility is connected to POTW and discharges ***less than*** 25,000 gallons per day of industrial wastewater	Chapter 2, Page 3-5	None
☐	Facility is connected to POTW and discharges ***more than*** 25,000 gallons per day of industrial wastewater	Contact NHDES	Limited
☐	Facility discharges to surface waters, requiring an individual NPDES permit	Contact NHDES	Full

Printers on a Septic System

Printing facilities that have a private septic system must not discharge any industrial wastewater into that septic system. Only domestic wastewater (bathrooms, kitchens, etc.) may be discharged to a septic system.

Industrial (non-domestic) wastewater includes:

- aqueous-based plate chemistry,
- developers,
- rinsewaters,
- fixer processed through a silver recovery unit,
- fountain solutions, and
- screen cleaning water and solutions.

If you generate any industrial wastewater, you have the following disposal options:

- Collect the industrial wastewater in 55-gallon drums or a tank and then have it hauled away for disposal; or
- Collect the non-hazardous industrial wastewater in 55-gallon drums or a tank and then evaporate it on-site. When using this option, calculations for Regulated Air Toxic Pollutants must be performed before installing the evaporator.
- Treat industrial wastewater to meet required levels, collect treated wastewater in 55-
- gallon drums or a tank and dispose by one of the above listed methods.
- *Example*: Spent fixer may be treated with a silver recovery unit and then be hauled off-site as a non-hazardous industrial wastewater or be incinerated on-site.
- Contact the Underground Injection Control (UIC) Program within the NHDES Water Division at (603) 271-2858 for additional options.

All industrial wastewater that is considered hazardous waste (e.g., untreated fixer) must be shipped offsite under the guidelines explained in Chapter 5 of this W*orkbook*.

It is good practice to hang a sign near all prepress and printing area sinks warning employees not to put any industrial wastewater into those sinks. An example sign is in Appendix H.

STOP: PRINTERS ON SEPTIC SYSTEMS
GO TO CHAPTER 4

POTW Dischargers (less than 25,000 gallons per day)

You must notify your POTW that you intend to discharge (or already are discharging) into their system. The POTW may or may not issue a permit depending on their internal procedures. Table 1 on Page 3-5 lists the POTW contacts for each city and town in NH.

- Your POTW will have specific requirements for pollutant discharges that you must meet.
- Your POTW will forward you these requirements (either written or verbal) once you contact them.

In addition to your POTW's requirements, there are specific state prohibitions (items you cannot put down the drain) for all industrial dischargers:

Specific Prohibitions:

- pollutants which create a fire or explosion hazard in the POTW, including, but not limited to, waste streams with a closed cup flashpoint of less than 140^{O} Fahrenheit or 60^{O} Centigrade using the test methods specified in 40 CFR 261.21;

- pollutants which will cause corrosive structural damage to the POTW, but in no case discharges with pH lower than 5.0, unless the POTW is specifically designed to accommodate such discharges;

- solid or viscous pollutants in amounts which will cause obstruction to the flow in the POTW resulting in interference with the flow or plant operations;

- any pollutant, including oxygen demanding pollutants (BOD, etc.) released in a discharge at a flow rate and/or pollutant concentration which will cause Interference with the POTW;

- heat in amounts which will inhibit biological activity in the POTW resulting in Interference, but in no case heat in such quantities that the temperature at the Treatment Plant exceeds 40 C (140 F) unless the Approval Authority, upon request of the POTW, approves alternate temperature limits;

- petroleum oil, nonbiodegradable cutting oil, or products of mineral oil origin in amounts that will ause interference or pass through;

- pollutants which result in the presence of toxic gases, vapors, or fumes within the POTW in a quantity that may cause acute worker health and safety problems;

- any trucked or hauled pollutants, except at discharge points designated by the POTW.

STOP: PRINTERS THAT DISCHARGE LESS THAN 25,000 GALLONS PER DAY TO A POTW
GO TO CHAPTER 4

POTW Dischargers (More than 25,000 gallons per day)

Contact the NH DES Water Division at (603) 271-3505 for your specific requirements.

Facilities Discharging to Surface Waters

NH DES does not recommend that printers discharge to surface waters. Facilities that discharge to surface waters are required to receive an individual NPDES permit. Contact the NH DES Water Division's Groundwater Discharge Permits Coordinator at (603) 271-3644 for your specific requirements.

TABLE 1:
NEW HAMPSHIRE POTW CONTACTS

FACILITY	ADDRESS	CITY	CHIEF OPERATOR	PHONE
ALLENSTOWN WASTEWATER	36 CANAL STREET	ALLENSTOWN	DANA CLEMENT	485-2027
ANTRIM WASTEWATER	PO BOX 517	ANTRIM	JIM CRUTHERS	588-2433
ASHLAND WASTEWATER	2 COLLINS ST	ASHLAND	RUSSELL CROSS	968-7193
MONADNOCK PAPER WASTEWATER	117 ANTRIM RD	BENNINGTON	MIKE BUTLER	588-3311
BERLIN WASTEWATER	DEVENS ST EXT	BERLIN	MICKEY THERRIAULT	752-8563
MERRIMACK CTY HM WASTEWATER	325 D W HIGHWAY	BOSCAWEN	CAM CADARETTE	796-3255
ROCKINGHAM CTY HM WASTEWATER	116 NORTH RD	BRENTWOOD	JOHN HARNDEN	679-5335
BRISTOL WASTEWATER	71 LAKE ST	BRISTOL	JEFF CHARTIER	744-5400
CANAAN WASTEWATER	PO BOX 38	CANAAN	JOE DAMOUR	523-9280
OSSIPEE WASTEWATER	PO BOX 512	CENTRE OSSIPEE	JOSEPH MOULTON	539-7150
CHARLESTOWN WASTEWATER	PO BOX 385	CHARLESTOWN	DAVE DUQUETTE	826-5387
CLAREMONT WWTF	RR 2 BOX 404	CLAREMONT	JASON BECKWITH	543-0680
SULLIVAN CTY HM WASTEWATER	RR 1 BOX 392	CLAREMONT	DAVID DUQUETTE	542-9511
COLEBROOK WASTEWATER	10 BRIDGE ST	COLEBROOK	KEVIN McKINNON	237-5200
CONCORD WASTEWATER	125 HALL ST	CONCORD	MIKE HANSCOM	225-8691
PENACOOK WASTEWATER	125 HALL STREET	CONCORD	RICHARD ROY	753-9830
WALLIS SANDS ST PARK WW	PO BOX 856	CONCORD	BRENT EDMONDS	271-2602
MOUNT WASHINGTON ST PARK	PO BOX 856	CONCORD	BRENT EDMONDS	271-2606
CONWAY WASTEWATER	PO BOX 342	CONWAY	THOMAS STEELE	447-3376
DERRY WASTEWATER	40 FORDWAY ST	DERRY	CHARLES BUZZELL	432-6149
DOVER WASTEWATER	484 MIDDLE RD	DOVER	RAY VERMETTE	516-6475
DOVER SEWER DEPARTMENT	288 CENTRAL AVE	DOVER	BILL BOULANGER	743-6078
BEECH HILL HOSP WASTEWATER	PO BOX 254	DUBLIN	JOHN CRESSY	563-8511 X245
DURHAM WASTEWATER	13 NEWMARKET RD	DURHAM	DUANE WALKER	868-2274
ENFIELD SEWER DEPARTMENT	PO BOX 373	ENFIELD		632-4002
EPPING WATER & SEWER	157 MAIN STREET	EPPING	NORMAN DIONNE	679-5171
EXETER WASTEWATER	10 FRONT ST	EXETER	VICTORIA ABBEY	773-6157
FARMINGTON WASTEWATER	39 NORTH MAIN ST	FARMINGTON	DALE SPRAGUE	755-4883
TORY PINES WASTEWATER	740 SECOND NH TURNPIKE	FRANCESTOWN	JIM CRUTHERS	588-2433
FRANCONIA NOTCH ST PARK WW		FRANCONIA	TOD ODELL	823-5563
FRANKLIN WASTEWATER - WRBP	PO BOX 68, RIVER RD	FRANKLIN	KENNETH NOYES	934-4032
GLENCLIFF HOME WASTEWATER	PO BOX 77	GLENCLIFF	STEVE HATCH	989-3111
GOFFSTOWN SEWER DEPT	51 DEPOT STREET	GOFFSTOWN	MICHAEL YERGEAU	497-3617
ROCHESTER WASTEWATER	31 WAKEFIELD ST	GONIC	DAVID GREEN	332-8950

FACILITY	ADDRESS	CITY	CHIEF OPERATOR	PHONE
WASTE MANAGEMENT INC - TURNKEY	PO BOX 7065	GONIC	TY CORNEAU	330-2145
GORHAM WASTEWATER	6 LOWER MAIN ST	GORHAM	KURT JOHNSON	466-3104
EASTMAN SEWER COMPANY	PO BOX 4	GRANTHAM	IRENE HANSLIN	863-4444
GREENVILLE WASTEWATER	109 OLD WILTON RD	GREENVILLE	WILLIAM PETERSEN	878-2800
GROVETON WASTEWATER	2 STATE ST	GROVETON	RICHARD MARSHALL	636-1450
NORTHUMBERLAND WASTEWATER	2 STATE STREET	GROVETON	RICHARD MARSHALL	636-1450
DORR WOOLEN WASTEWATER	PO BOX 87	GUILD	JAMES ORROK SR	863-1195
HAMPTON WASTEWATER	100 WINNACUNNET	HAMPTON	STEVE ASLIN	926-4402
HANOVER WASTEWATER	PO BOX 483	HANOVER	WILLIAM MATHIEU	643-2362
HENNIKER WASTEWATER	2 DEPOT RD	HENNIKER	KEN LEVESQUE	428-7215
HILLSBORO WASTEWATER	PO BOX 7	HILLSBORO	PAUL DUTTON	464-5041
HINSDALE WASTEWATER	PO BOX 13	HINSDALE	ROBERT JOHNSON	336-5714
HOOKSETT WASTEWATER	1 EGAWES DRIVE	HOOKSETT	BRUCE KUDRICK	485-7000
CONTOOCOOK VIL. WASTEWATER	330 MAIN ST.	HOPKINTON	STEVE CLOUGH	746-3389
JAFFREY WASTEWATER - DPW	10 GOODNOW ST	JAFFREY	LEWIS GREGORY	532-6914
KEENE DEPT. OF PUBLIC WORKS	580 MAIN ST	KEENE	DONNA HANSCOM	357-9836
LACONIA PUMPING STATION	202 WATER ST	LACONIA	STEVE YOUNG	528-6746
LACONIA SEWER DIVISION	257 MESSER ST	LACONIA	BOB CUNNINGHAM	527-1266
LANCASTER WASTEWATER	25 MAIN ST	LANCASTER	TIM BILODEAU	788-2824
LANCASTER GRANGE WASTEWATER	25 MAIN ST	LANCASTER	TIM BILODEAU	788-3391
LINCOLN WASTEWATER	MAIN STREET	LINCOLN	PATRICK BUTLER	745-3829
LISBON WASTEWATER	45 SCHOOL ST	LISBON	TERRY WELCH	838-6027
LITTLETON WASTEWATER	PO BOX 413	LITTLETON	WILLIAM GILPATRIC	444-5400
MANCHESTER WASTEWATER	300 WINSTON ST	MANCHESTER	TOM COREY	624-6526
MERIDEN WASTEWATER	PO BOX 171	MERIDEN	BILL TAYLOR	469-3486
MERRIMACK WASTEWATER	PO BOX 235	MERRIMACK	LARRY SPENCER	883-8196
MILFORD WASTEWATER	1 UNION SQUARE	MILFORD	TOM NEFORAS	673-9441
MILTON WASTEWATER	TOWN OFFICE	MILTON	DALE SPRAGUE	653-9422
CENTRE HARBOR WASTEWATER	RR 1 BOX 255	MOULTONBORO	ARTHUR GLASKI	476-5670 (H)
SUNAPEE ST PARK WASTEWATER	PO BOX 2021	MT SUNAPEE	JIM FREEMAN	763-5110
NASHUA WASTEWATER	SAWMILL RD	NASHUA	RICK SEYMOUR	589-3560
GILSON ROAD GW REMEDIATION	57 GILSON RD	NASHUA	JOHN FRITSCH	882-3343
NEW BOSTON AFTS WASTEWATER	317 CHESTNUT HILL RD	NEW BOSTON	BRUCE LARRABEE	471-2332
NEW HAMPTON VILLAGE PRECINCT	PO BOX 506	NEW HAMPTON	JOSEPH POWERS Jr	744-8356 (H)
NEW LONDON SEWER DEPT	31 S PLEASANT ST	NEW LONDON	DOUG GAY	526-6411
NEWBURY WASTEWATER	PO BOX 296	NEWBURY	TIM MULDER	763-2121 (P)
NEWFIELDS WASTEWATER	PO BOX 301	NEWFIELDS	PETER HELLFACH	778-8213
NEWINGTON WASTEWATER	115 GOSLING RD	NEWINGTON	DENIS MESSIER	431-4111
NEWMARKET WASTEWATER	186 MAIN STREET	NEWMARKET	GEORGE LANEY	659-3093
NEWPORT WASTEWATER	15 SUNAPEE ST - SUITE 1	NEWPORT	ARNOLD GREENLEAF	863-4338
STRATFORD MILL HSE WW	RIVER STREET	NO, STRATFORD	DEBRA SMITH	922-5256
NORTH CONWAY WASTEWATER	BOX 630 SEAVEY ST	NO. CONWAY	PETER LaBONTE	356-5338
STRATFORD VILLAGE WW	RIVER STREET	NO. STRATFORD	DEBRA SMITH	922-5256
WOODSTOCK WASTEWATER	PO BOX 156	NO. WOODSTOCK	WILLIAM MELLET	745-8783
LOST RIVER RES. WASTEWATER	PO BOX 87	NO. WOODSTOCK	JERROLD WEST	745-8031
KEARSARGE REG HS WASTEWATER	457 NORTH ROAD	NORTH SUTTON	BRENT HERRING	927-4261
CARROLL CTY HOME WASTEWATER	ROUTE 171 BLDG. 2	OSSIPEE	ALAN SEQUIN	539-2282
PETERBOROUGH WASTEWATER	1 GROVE STREET	PETERBOROUGH	STEVE HODGE	924-8000
PIERMONT WASTEWATER	PO BOX 115	PIERMONT	JOHN METCALF	272-4372

FACILITY	ADDRESS	CITY	CHIEF OPERATOR	PHONE
PITTSBURG WASTEWATER	PO BOX 308	PITTSBURG	PAUL AMEY	538-6697
PITTSFIELD WASTEWATER	PO BOX 98	PITTSFIELD	RONALD VIEN	435-8857
PLYMOUTH VILLAGE W&S DIST.	227 OLD NO. MAIN ST.	PLYMOUTH	MAURICE GAUTHIER	536-2769 plt
PORTSMOUTH WASTEWATER	680 PEVERLY HILL RD	PORTSMOUTH	ART HOFFMAN	427-1553
PEASE INTL.TRD PORT WASTEWATER	680 PEVERLY HILL RD	PORTSMOUTH	ART HOFFMAN	427-1553
PORTSMOUTH SEWER MAINT. DIV.	680 PEVERLY HILL RD	PORTSMOUTH	JIM DONNISON	427-1530
STAR ISLAND	10 VAUGHAN MALL, SUITE #8	PORTSMOUTH	JOSEPH W WATTS	964-7252
FRANKLIN PIERCE WASTEWATER	PO BOX 60	RINDGE	JOE DAMOUR	899-4012
ROLLINSFORD WASTEWATER	PO BOX 174	ROLLINSFORD	JACK HLADICK	742-8124
WAKEFIELD - WOODARD & CURRAN	PO BOX 86	SANBORNVILLE	KEVIN FOLEY	522-3604
SANDWICH WASTEWATER	TOWN OFFICE	SANDWICH	ROBERT ROWAN	476-5670
SEABROOK WASTEWATER	PO BOX 456	SEABROOK	PHIL MALTAIS	474-8012
SOMERSWORTH WASTEWATER	157 MAIN ST	SOMERSWORTH	JAMIE WOOD	692-2418
SUNAPEE WASTEWATER	PO BOX 347	SUNAPEE	TIM MULDER	763-2121 (P)
SWANZEY SEWER COMM.	PO BOX 10009	SWANZEY	TOM HASTINGS	352-6550
TROY WATER & SEWER DEPT.	PO BOX 215	TROY	BRAD BEAUDOIN	242-3890
WARNER VILLAGE WATER DIST.	PO BOX 252	WARNER	JAMES BAILEY	456-3890
WATERVILLE VALLEY WW	TRIPOLI ROAD	WATERVILLE VAL	TIMOTHY KINGSTON	236-4781
WEARE WASTEWATER	TOWN OFFICE	WEARE	ROBERT PHILLIPS	529-1650
LEBANON WASTEWATER	130 SOUTH MAIN ST	WEST LEBANON	DON SCHAGEN	298-5986
CHESHIRE CTY HM WASTEWATER	201 RIVER ROAD	WESTMORELAND	ROBERT RIENDEAU	399-4912 X323
BETHLEHEM WASTEWATER	RR 1 BOX 152	WHITEFIELD	TERRY WELCH	869-3440
WHITEFIELD WASTEWATER	7 JEFFERSON ROAD	WHITEFIELD	WILLIAM ROBINSON	837-9871
BRETTON WOODS WASTEWATER	RR 1 BOX 152	WHITEFIELD	TERRY WELCH	846-5464
MT WASHINGTON HOTEL WW	RR 1 BOX 152	WHITEFIELD	TERRY WELCH	837-2332
WILTON WATER & SEWER DEPT.	TOWN OFFICE	WILTON		645-9451
WINCHESTER WASTEWATER	TOWN HALL	WINCHESTER	ARTHUR BOUDREAU	239-4132
SISTERS OF MERCY WASTEWATER	21 SEARLES ROAD	WINDHAM	EDWARD STOLARZ	893-6550
WOLFEBORO WASTEWATER	FILTER BED RD PO BOX 492	WOLFEBORO	JOHN CRAIGUE	569-2314 (P)
WOODSVILLE WASTEWATER	PO BOX 53	WOODSVILLE	ANTHONY ROY	747-3489

WASTEWATER TREATMENT PROCESS KEY

ABF - ACTIVATED BIOFILTER	PC - PHISIOCHEMICAL
AL - AERATED LAGOON	PS - PUMP STATION
ANR - ADVANCED NUTRIENT REMOVAL	RBC - ROTATING BIOLOGICAL CONTACTOR
AP - ADVANCED PRIMARY	RI - RAPID INFILTRATION
AS - ACTIVATED SLUDGE	SD – SUBSURFACE DISPOSAL
CL - CHLORINATION	SF - SAND FILTER
DC - DECHLORINATION	SI - SPRAY IRRIGATION
EA - EXTENDED AIR	SP - STABILIZATION POND
GW - GROUNDWATER RECHARGE	ST - SEPTIC TANK
IT - INHOFF TANK	TF – TRICKLING FILTER
N - NITROGEN REMOVAL	DC – DECHLORINATION
OD - OXIDATION DITCH	UV – ULTRAVIOLET DISINFECTION

TABLE 2:
BEST MANAGEMENT PRACTICES - WASTEWATER

The following best management practices are recommended for all printing facilities:

Film Processing

1. Do not use chrome-based film cleaners. They are a two part system that when mixed together form chromic acid.
2. Use formaldehyde free film chemistry, if available.
3. Test chemistry for activity prior to changing out in lieu of a routine changing schedule. A quality control device such as a gray scale with a half-tone pattern can be used for evaluation.
4. Periodically adjust unit for proper feed rate of fixer, developer, and wash water.
5. Properly maintain processing units.
6. Periodically check squeegee rollers for undue wear and hardness.
7. Use floating lids on storage containers for mixed working solutions to minimize waste and spoilage.
8. Use chemistry before expiration date and use the oldest chemistry first over newer chemistry.
9. Keep mixing area, apparatus, and containers clean. Use separate mixing containers for each type of chemistry.
10. Mix only enough chemicals to be used during its effective life.
11. Adopt Code of Management Practice for silver discharges.
12. Investigate purchasing developer, fixer, and wash water recycling units, if cost effective.
13. Investigate purchasing automatic mixing equipment, if cost effective.
14. Investigate using an image setter, if cost effective.
15. Investigate using direct-to-image carrier (e.g., plate, screen, etc,).
16. For tray processing, use a stop bath prior to immersing film into the fix solution.
17. For tray processing, use a squeegee to remove excess chemistry between baths.
18. For tray processing, cover containers when not being used.

Image Carrier Preparation

19. Do not use chrome-based plate cleaners. They are a two part system that when mixed together form chromic acid.
20. Test chemistry for activity prior to changing out in lieu of a routine changing schedule. A quality control device such as a gray scale with a half-tone pattern can be used for evaluation.
21. Periodically adjust unit for proper feed rate of developer, finisher, and wash water.
22. Properly maintain processing units.
23. Periodically check squeegee rollers for undue wear and hardness.
24. Use chemistry before expiration date and use the oldest chemistry first over newer chemistry.
25. Keep mixing area, apparatus, and containers clean. Use separate mixing containers for each type of chemistry.
26. Mix only enough chemicals to be used during its effective life.
27. For conventional lithographic plates, use aqueous-based plate development solution. Either recycle the spent chemistry, if appropriate, or properly dispose of it.
28. For waterless lithographic plates, do not discharge the spent chemistry. Either recycle the spent chemistry or properly dispose of it.
29. For bimetallic lithographic plates, do not discharge the spent chemistry.
30. For solvent-based plate developing solutions, do not discharge the spent chemistry. Either recycle the spent chemistry, if appropriate, or properly dispose of it.

31. Investigate purchasing wash water recycling units, if cost effective.
32. Investigate purchasing automatic mixing equipment, if cost effective.

Press and Post Press

1. Remove excess inks, coatings, glues, and fountain solution from equipment prior to cleaning in a sink.
2. Allowed to discharge _____ gallons of fountain solution per month.*
3. Allowed to discharge _____ gallons of water based coatings and glues per month.*
4. Allowed to discharge _____ gallons of wastewater from equipment component cleaning activities such as that generated from periodic plate cleaning.*
5. Water-based inks should be treated with micro/ultra filtration to remove color prior to discharging to POTW.
6. For lithographic fountain solutions, do not use concentrates containing chrome. This needs to be confirmed with supplier, as MSDS will not identify it as an ingredient.
7. For lithographic fountain solutions, establish water quality testing program for incoming water for better process control.
8. For lithographic fountain solutions, install, only if cost effective, an incoming water treatment system to eliminate incoming water quality fluctuations.
9. For lithographic fountain solution recirculating systems, install in-line filtration to reduce contamination due to paper debris, ink, and other contaminants.
10. For lithographic fountain solutions, install, only if cost effective, an automix system to provide for consistent press ready fountain solution.
11. For heatset web offset printing presses, install, only if cost effective, a closed loop chill roll cooling water system.
12. Remove excess ink from screens prior to cleaning in a sink.
13. Remove excess ink from equipment before cleaning in a sink.
14. Investigate feasibility of using high pressure wash systems to clean screens to eliminate degreasers, emulsions and haze removers
15. Install a water filtration system for ink particulates.

* Based on POTW limits

CHAPTER 4:

Evaluating Stormwater Releases

The **Clean Water Act** also regulates STORM WATER runoff that has been in contact with industrial storage materials, wastes, loading docks, and other potential sources of chemical contamination. These regulations prevent chemicals and wastes from contaminating surface and groundwater. However, when companies keep these areas under cover, protected from storm water (rain and snow), they do not come under regulation. Regulation and management of storm water discharge falls under National Pollutant Discharge Elimination System (NPDES) requirements of the Clean Water Act. Either a facility does or does not have discharge of contaminated storm waters to surface water.

Introduction

Proper Management of Stormwater prevents potentially harmful chemicals from contaminating surface or ground water. All industrial facilities that potentially discharge storm water containing pollutants to a water of the United States must apply for coverage under a National Pollutant Discharge Elimination System (NPDES) permit**. However, a permit is not required at facilities that can certify a "no exposure" condition is maintained. No exposure exists at an industrial facility when it precludes exposure of industrial activities to storm water.**

In other words, all industrial materials or activities, including, but not limited to, material handling equipment, industrial machinery, raw materials, intermediate products, by-products or waste products are protected by a storm-resistant shelter so as not to be exposed to rain, snow, snowmelt, or runoff. Adequately maintained mobile equipment (e.g., trucks, automobiles, trailers, found at the industrial site, that are not leaking contaminants or are not otherwise a source of industrial pollutants) may be exposed to precipitation or runoff without requiring a permit.

Do not Store any Chemicals Outside the Building

The easiest way to prevent the facility from requiring a stormwater permit is to not store any chemicals or other raw materials outside. The only item that can be stored outside (without requiring a permit) are wooden pallets.

Cover Your Loading Dock

One trouble spot for printers is the potential for exposure of chemicals to stormwater during transfer into the building from delivery trucks. If your loading dock is covered, any chemicals or other materials brought into the facility via the loading dock will not be exposed to stormwater thus preventing you from requiring a stormwater permit.

Stormwater Discharges to POTW

If contaminated storm water is discharged to (or is planned to be discharged to) the POTW, the POTW must be notified and permission to discharge obtained. As part of the PrintSTEP process, the state will coordinate this notification. A NPDES permit is not necessary if all storm water is discharged to the POTW.

Determining "No-Exposure"

Use the following checklist to determine if a "no exposure" condition exists at your facility. Circle "Yes" or "No" as appropriate to describe conditions at your facility. If you answer "Yes" to any of the questions, a potential for exposure exists at your site and you cannot immediately certify a no-exposure condition exists. You must contact the NHDES to determine your requirements, and if necessary, obtain coverage under a NPDES Storm Water permit if you have not already done so.

Storm Water Exposure Checklist

Are any of the following items exposed to precipitation, now or in the foreseeable future? Is the drainage from these areas discharged from the site to any surface waters or a storm sewer system?

a. vehicles used in material handling (excepting adequately maintained mobile equipment).	Y or N
b. industrial machinery or equipment	Y or N
c. residue from the cleaning of machinery or equipment	Y or N
d. materials associated with vehicular maintenance, cleaning, or refueling	Y or N
e. materials or products during loading/unloading or transporting activities	Y or N
f. materials or products at uncovered loading docks	Y or N
g. materials or products stored outdoors (except for products intended for outdoor use, e.g., cars)	Y or N
h. materials or products handled/stored on roads or railways owned or maintained by the certifier	Y or N
i. materials or spill/leak residues accumulated in storm water drain inlets	Y or N
j. residuals on the ground from spills/leaks (including subsurface residuals from percolation)	Y or N
k. materials contained in open or deteriorated storage tanks/drums/containers	Y or N
l. industrial activities conducted outdoors	Y or N
m. materials or products from past outdoor industrial activity	Y or N
n. waste material, (i.e. drums or containers…)	Y or N
o. process waste water disposed of outdoors (unless otherwise permitted)	Y or N
p. particulate matter from roof stack/vents not otherwise regulated (i.e., under air quality control permit) and in quantities detectable in the storm water outflow	Y or N
q. visible deposits of residuals near roof or side vents	Y or N
r. spills/leaks resulting from maintenance of stacks or air exhaust systems	Y or N

Determining your Stormwater Status

After completing the Stormwater Exposure Checklist, complete the following:

Check one:	Your STORM WATER is:
☐	A "no exposure" condition exists. **STOP: Go to Chapter 5**
☐	Regulated by a NPDES general permit for storm water discharge. Continue with this Chapter

Requirements for Printers Regulated by a NPDES general permit for stormwater

Unless you have a "no-exposure" condition, the following requirements apply under the NPDES general permit for stormwater:

Materials Management

- ✓ Have site specific Best Management Practices (BMPs) based on facility size, climate, geographic location, geology/hydrology and the environmental setting of each facility, and volume and type of discharge generated.

Administrative

- ✓ Submit a notice of intent (NOI) to be covered by this general permit.

Monitoring

- ✓ Conduct a comprehensive site compliance evaluation once a year by qualified personnel. The inspection is to:
  - Confirm the accuracy of the description of potential discharge sources identified in the Pollutiion Prevention Plan. (The Plan describes your company's source reduction program),
  - Determine the effectiveness of the P2 plan,
  - Assess compliance with the terms and conditions of the permit. Based on results of each evaluation, description of potential pollution sources and measures of control must be revised as appropriate within 2 weeks after each evaluation. Changes in the measures and controls must be implemented on the site in a timely manner, never more than 12 weeks after completion of the evaluation.

- ✓ Conduct quarterly (January - March, April – June, July – September, October - December) visual examinations of a storm water discharge from each point of discharge. The inspection must be of a grab sample collected from each point of discharge. Samples must be collected within the first hour and preferably within the first 30 minutes of when the runoff begins discharging. The examination of the sample shall include any observations of color, odor,

turbidity, floating solids, foam, oil sheen, or other obvious indicators of storm water pollution. The examination must be conducted in a well lit area.

Record Keeping

- ✓ Retain the comprehensive site compliance evaluation reports for at least 3 years after the date of the evaluation.

- ✓ Retain records on the status and effectiveness of the P2 plan implementation including the success and failure of BMPs at the facility.

- ✓ Maintain quarterly visual examination reports which must include:
    - the examination date and time
    - examination personnel
    - visual quality of the storm water discharge
    - probable sources of any observed storm water contamination

- ✓ Maintain records on site with the P2 plan. If a visual examination can not be made due to adverse climatic conditions, this must be documented and the report maintained with the P2 plan.

Pollution Prevention Plan

- ✓ Maintain a pollution plan on site with a description of potential pollutant sources including:
    - site map
    - inventory of exposed materials
    - significant spills and leaks
    - non-storm water discharges
    - sampling data
    - summary of potential pollutant sources

- ✓ Select, describe and evaluate the P2 measures, BMPs, and other controls that will be implemented at the facility. Source reduction includes preventive maintenance, spill prevention, good housekeeping, training, and material management. If source reduction is not an option include BMPs such as material coverings, water diversion and dust control. If neither is available, then recycling or waste treatment are other alternatives. P2 plans must discuss reasons for selecting control or practice and how each will be addressed at the facility. Measures and controls must address the following:
    - good housekeeping
    - preventive maintenance
    - spill prevention and response procedures
    - inspections
    - employee training
    - record keeping and internal reporting procedures
    - sediment and erosion control
    - management of run off

Modifications

- ✓ If your storm water status changes, see Chapter 2 of this *guide* for guidance on updating your PrintSTEP Agreement.

CHAPTER 5:
Hazardous Waste Management

Introduction to Hazardous Waste

The **RESOURCE CONSERVATION AND RECOVERY ACT** (RCRA) is the federal law that tracks hazardous waste from cradle-to-grave. Under RCRA, hazardous waste is regulated from the point it is generated (the cradle) through its ultimate point of disposal (the grave). This law and its implementing regulations define hazardous waste, and specifies labeling, storage, treatment, disposal and reporting requirements for these wastes. RCRA regulations generally require that printers document the amount and type of wastes they ship and where it is treated or disposed.

Typical Printer Wastes

Typical printer wastes that may be considered hazardous include waste ink, waste solvent, waste oil, spent fixer, processed developer, and solid wastes such as soiled absorbent socks (commonly referred to as "PIGs"). Depending on the characteristics of the waste, the waste may be considered "hazardous". Regardless, the waste must be managed to prevent its release into the environment.

Obtaining an EPA Identification Number

Any printing facility that generates **any** hazardous waste must obtain an EPA Identification Number. An EPA identification number is unique to each printing facility. If you have additional print shops at various locations, every facility will need its own identification number. This number will appear on the "cradle to grave" paperwork required with each shipment of hazardous waste. Contact the NH DES Waste Management Division at 603-271-2900 if your facility does not have an EPA Identification Number.

What Wastes are Considered Hazardous

A waste is **hazardous** if it:

- exhibits hazardous characteristics (defined below) OR
- is listed in the regulations (See Appendix C).

Characteristic Hazardous Wastes are wastes that have any of these hazardous characteristics:

- **Ignitable --** Easily catches fire; flashpoint is below 140 ^{O} F. (See your MSDS.) **An example is isopropyl alcohol.** The waste code for ignitable waste is "D001."
- **Corrosive --** Aqueous liquids (liquids containing water) that easily corrode materials (e.g., metal drums) or human tissue and have a pH of less than or equal to 2 or greater than or equal to 12.5. **An example is battery acid (ph< 2) or sodium hydroxide (pH>12.5).** The waste code for corrosive waste is "D002."

- ⇨ **Reactive --** Potentially explosive or produces toxic gases when mixed with water, air, or other incompatible materials. **Printers do not normally generate reactive wastes.** The waste code for reactive waste is "D003."

- ⇨ **Toxic --** If laboratory testing of a chemical extract of your waste shows specific constituents, such as cadmium, chromium, or silver, and exceeds specified levels, the waste is hazardous. **Examples may include plate processing chemicals and waste fixer.** The waste codes for toxic waste range from "D004- D0043." The waste code for silver bearing waste is "D011."

Listed Hazardous Wastes are certain wastes that EPA has designated as hazardous. Each listed waste has a waste code, beginning with the letter "U", "F", "P", or "K". Any non-hazardous materials that are contaminated with listed waste are considered hazardous waste.

Listed hazardous waste that printers may generate include:

- waste solvents ("F-Solvents" such as methylene chloride)
- unused, discarded or off-specification materials (e.g., unused methanol, "U" wastes)

Handling of Shop Towels

- Contaminated shop towels do not need to be handled as hazardous waste if:
- they bear no free liquid
- they are placed in sealed containers or bags for storage and/or transportation
- the containers or bags are labeled "contaminated wipers for laundering"
- the towels are sent to a commercial laundry facility for laundering or may be laundered on-site under certain conditions.

Case Study : Handling Shop Towels

A printing facility in Connecticut has significantly reduced its waste streams and implemented various techniques to prevent pollution. One area of concern was the cleanup process because, solvent-laden shop towels are considered hazardous waste. If there is too much solvent in the towels, they could be rejected by industrial laundry services. The company rents the shop towels through an industrial laundry and reuses them. To minimize the solvent in the towel before laundering, the facility now places the towels on a strainer in a closed container. Reusing shop towels reduces the amount of hazardous waste sent off-site and also reduces the costs of hazardous waste disposal.

Source: Feldman, Michael, Pollution Prevention: Environmental Management's Next Goal, GATFWORLD, Vol. 5, Issue 6

Handling of Fluorescent Bulbs

Fluorescent and high intensity discharge (HID) lamps contain a small quantity of mercury that may pose a hazard to human health or the environment when improperly managed. Printers are prohibited to dispose of these lamps or bulbs in the regular trash and should recycle them. See Appendix C for fluorescent bulb best management practices and a list of recycling facilities.

Handling of Waste Oil

Used oil is classified as a hazardous waste, but when recycled, it is subject to less stringent requirements. Shops that burn used oil for fuel must notify the NH DES Division of Air Resources at (603) 271-1370 as well as the NH DES Waste Management Division at (603) 271-2900.

Determining your Facility's Hazardous Waste Status

Environmental regulations require printers to determine how much hazardous waste their facility generates each calendar month. This will determine your hazardous waste status. The quantity of hazardous waste you generate may change from month to month, so in order to decide your hazardous waste status you must use the month where you generated the most waste (highest category) during normal operation. The three hazardous waste categories are as follows:

	How much HAZARDOUS WASTE do you generate per month?
☐	Up to 100 kg (220 pounds or ~27 gallons) You are a **Small Quantity Generator**
☐	Greater than 100 kg but less than 1000 kg (220 and 2,200 pounds, or ~27 and ~270 gallons) You are a **Full Quantity Generator (less than 1000 kg per month)**
☐	More than 1000 kg (2,200 pounds or ~270 gallons) You are a **Full Quantity Generator (more than 1000 kg per month)** **Call 603-271-2942 to review requirements**

Most New Hampshire printers will fall under the Small Quantity Generator or Full Quantity Generator (less than 1000 kg/month) categories.

Requirements for Small Quantity Generators

You are a Small Quantity Generator (SQG) if your facility generates the following:

- Less than 100 kg (220 lbs) per calendar month of hazardous waste; or
- Less than 1 kg (2.2 lbs) per calendar month of acute hazardous waste; or
- Less than 100 kg per calendar month of acute hazardous waste spill residue.
- Note: Printers usually do not generate acutely hazardous wastes. For a list of these wastes, see Table 4.1 in Env-Wm 402.04 (the state's hazardous waste rules).

Hazardous waste requirements for SQG's include the following:

Materials Management

✓ Accumulate no more than 1,000 kg (2,200 lbs) of hazardous waste on site.

✓ Accumulate waste in tanks or containers, such as 55-gallon drums. Key requirements for managing hazardous waste in containers include:

- label each container with the words "HAZARDOUS WASTE", mark each container with the date the waste accumulation begins, identified contents, and waste number.
- use a container made of, or lined with, a material that is compatible with the hazardous waste to be stored to prevent the waste from reacting with or corroding the container.
- keep all containers holding hazardous waste closed during storage, except when adding or removing waste.
- inspect areas where containers are stored at least weekly. Look for leaks and for deterioration caused by corrosion or other factors.
- maintain the containers in good condition. If a container leaks, put the hazardous waste in another container, or contain it in some other way that complies with EPA regulations.
- a storage container holding a hazardous waste that is incompatible with any material or waste stored nearby must be separated or protected from the other material by a dike, berm, all or other device.

Tank requirements were not included here because of their limited use by printers. However, if you accumulate waste in tanks, you should refer to 40 CFR part 265, Subpart J (Tank Systems) for a list of requirements, or call (603) 271-2942 at your state agency for assistance.

✓ There is no time limit for on-site storage. Further, you may not establish satellite accumulation areas, but may take advantage of the SQG Extended Quantity and Storage Provision (Env-WM 508.03).

Land Disposal Restrictions

✓ Most hazardous wastes may not be land disposed (placed in a landfill) unless and until they meet "treatment standards." Land disposal is a broad term under RCRA, which includes placing hazardous wastes on the land, not only to dispose it but also to store it. The Land Disposal Restrictions (LDR) program requires that the waste is treated to reduce the hazardous constituents to levels set by EPA, or that the waste is treated using a specific technology. It is the printer's responsibility to ensure that his/her waste is treated to meet LDR treatment standards if it is to be land disposed. Your Treatment, Storage and Disposal Facility (TSDF) will do this, since the printer is not allowed to treat hazardous waste.

✓ With the initial shipment of waste to each designated TSDF, send a one- time written notice to each TSDF receiving the waste, and keep a copy in your file. This notice must include information regarding whether or not wastes meet treatment standards or whether the waste is excluded by the definition of hazardous or solid waste or is otherwise exempt.

Accident Prevention

✓ Operations must be maintained and operated to minimize the possibility of a fire, explosion or other accident involving hazardous waste or hazardous waste constituents. All printers who are SQGs must be equipped with:

Portable fire extinguishers, fire control devices (including special extinguishing equipment, such as that using foam, inert gas, or dry chemicals), spill control materials, and decontamination supplies.

Responding to Emergencies

✓ Have at least one employee either on the premises or on call (i.e., available to respond to an emergency by reaching the facility within a short period of time) with the responsibility of coordinating all emergency response measures. This employee is the emergency coordinator.

✓ Post the following information next to the telephone:
- a name and telephone number of the emergency coordinator;
- the location of fire extinguishers and spill control material, and, if present, fire alarm; and
- the telephone number of the fire department, unless the facility has a direct alarm

✓ The emergency coordinator or his designee must respond to any emergencies that arise. The applicable responses are as follows:
- In the event of a fire, call the fire department or attempt to extinguish the fire using a fire extinguisher.
- In the event of a spill, contain the flow of hazardous waste to the extent possible, and as soon as is practicable, clean up the hazardous waste and any contaminated materials and soil.
- In the event of a fire, explosion, or other release which could threaten human health outside the facility, or when the printer has knowledge that a spill has reached surface water, the printer must immediately notify the National Response Center using their 24-hour toll free number, (800) 424-8802.
- The report must include the following information:
  - the name, address and US EPA Identification number of the printer;
  - date, time, and type of incident (e.g., spill or fire);
  - quantity and type of hazardous waste involved in the incident
  - extent of injuries, if any; and
  - estimated quantity and disposition of recovered materials, if any.

SQGs are not required to develop a written contingency plan unless more than 100 kg of hazardous waste is stored on-site. In case of fire, explosion, or release of hazardous waste, having such a plan would provide an organized and coordinated course of action.

Personnel Training

✓ Although personnel training is not legally required unless the total quantity of hazardous waste on-site is more than 100 kg (approximately ½ a 55-gallon drum), individuals working with hazardous waste should be trained how to properly handle these waste to ensure their safety and to ensure the wastes are safely and properly managed.

✓ Ensure that all employees are thoroughly familiar with proper waste handling and emergency procedures, relevant to their responsibilities during normal facility operations and emergencies.

Pre-Transport and Transport Requirements

- ✓ You may self-transport no more than 55 gallons of hazardous waste to a permitted hazardous waste transfer, treatment, storage, or disposal facility in accordance with Env-Wm 601.02 (b).

- ✓ The waste must be transported in full, sealed, and labeled containers that are compatible with the waste generated.

- ✓ If you're sending your waste off site, send your waste only to a facility permitted to handle the waste. Check with the NHDES Waste Management Division to be sure the facility you select has all necessary permits.

- ✓ When shipping waste off-site, package, label, and mark your shipment, and placard the vehicle in which your waste is shipped as specified in DOT regulations. Most printers probably use a commercial transporter to ship hazardous waste. These transporters can advise you on specific requirements for placarding, labeling, marking, and packaging. However, you remain responsible for compliance. For additional information, call the DOT hazardous materials information line at (202) 366-4488.

- ✓ Prepare a hazardous waste manifest to accompany your shipment. A hazardous waste manifest is a multi-part form designed to track hazardous waste from generation to disposal. This form will help you track your waste during shipment and make sure it arrives at the proper destination. SQGs that have a contractual agreement with a waste reclaimer that specifies the types and frequencies of shipments do not need to manifest the wastes if they retain a copy of the agreement and the vehicle used to transport the waste is owned and operated by the waste reclaimer. Obtain a manifest form from the NH DES Waste Management Division.

- ✓ Fill in all parts of the manifest including your hazardous identification number. The transporter signs the completed manifest when the shipment is accepted for transport. The facility operator at the designated TSDF also signs the form when the shipment is received and sends a copy back to the generator. You must keep this copy on file for three years.

Reporting

- ✓ If you do not receive a copy of the manifest from the receiving facility within 30 days of shipment, you are required to contact the transporter and/or treatment, storage, and disposal facility to determine its status, and to submit an exception report within 45 days to NH DES.

- ✓ You are required to maintain uniform hazardous waste manifests, copies of Notification of Intent to generate hazardous waste forms, and weekly storage container inspection records for 3 years.

Waste Minimization Certification

- ✓ Certify on your Hazardous Waste Manifest, under Item 16, that a good faith effort has been made to minimize waste generation and you have selected the best waste management method that is available and that you can afford.

Record Keeping

- ✓ You are required to maintain uniform hazardous waste manifests, copies of Notification of Intent reports, and weekly storage container inspection records for 3 years.

- ✓ New Hampshire state summary report is due on an annual basis.

- ✓ If your facility generates more than 300 kg of hazardous waste within 3 calendar months, you must submit quarterly reports to the NH DES.

STOP: IF YOU ARE A SQG, GO TO CHAPTER 6

Requirements for Full Quantity Generators

(<1000kg per month)

- You are a Full Quantity Generator (FQG) if your facility generates the following:
- More than 100 kg (220 lbs) per calendar month of hazardous waste; or
- More than 1 kg (2.2 lbs) per calendar month of acute hazardous waste.
  Note: Printers usually do not generate acutely hazardous wastes. For a list of these wastes, see Table 4.1 in Env-Wm 402.04 (the state's hazardous waste rules).

Hazardous waste regulations for FQG's include the following:

Materials Management

✓ Accumulate waste in tanks or containers, such as 55-gallon drums. Key requirements for managing hazardous waste in containers include:

- label each container with the words "HAZARDOUS WASTE", mark each container with the date the waste accumulation begins, identified contents, and waste number.
- use a container made of, or lined with, a material that is compatible with the hazardous waste to be stored (to prevent the waste from reacting with or corroding the container).
- keep all containers holding hazardous waste closed during storage, except when adding or removing waste.
- inspect areas where containers are stored at least weekly. Look for leaks and for deterioration caused by corrosion or other factors.
- maintain the containers in good condition. If a container leaks, put the hazardous waste in another container, or contain it in some other way that complies with EPA regulations.
- special standards must be met for ignitable and incompatible waste.
- a storage container holding a hazardous waste that is incompatible with any material or waste stored nearby must be separated or protected from the other material by a dike, berm, wall or other device.
- manage hazardous waste in containers according to air emission standards for process vents; equipment leaks; and tanks, surface impoundments and containers. (CFR part 265, subpart AA, BB, and CC).

- containment systems must be used if hazardous waste is stored near manholes or functional floor drains.

(Requirements for tanks, drip pads and containment buildings were not included here because of their very limited use by printers. However, if you accumulate waste in tanks or have drip pads or containment buildings, you should refer to 40 CFR part 265, Subpart J, W and/or DD, respectively, for a list of requirements, or call (603)271-2942 at your state agency for assistance.)

✓ There is no maximum weight limit for on-site accumulation. A printer who accumulates hazardous waste on-site for more than 90 days is an operator of a storage facility and is subject to the requirements of 40 CFR parts 264 and 265 and the permit requirements of 40 CR 270, unless they have been granted an extension to the 90 day period. Such an extension may be granted by EPA if hazardous wastes must remain on site for longer than 90 days because of unforeseen, temporary and uncontrollable circumstances. An extension of up to 30 days may be granted by the EPA Administrator on a case-by-case basis. For FQGs that store hazardous waste at or near the point of generation, the satellite storage provisions (Env-Wm 509.03) may apply.

Land Disposal Restrictions

✓ Most hazardous wastes may not be land disposed unless and until they meet "treatment standards." Land disposal is a broad term under RCRA, which includes placing hazardous wastes on the land, not only to dispose it but also to store it. The Land Disposal Restrictions (LDR) program requires that the waste is treated to reduce the hazardous constituents to levels set by EPA, or that the waste is treated using a specific technology. It is the printer's responsibility to ensure that his/her waste is treated to meet LDR treatment standards if it is to be land disposed. Most printers will probably have their designated TSDF do this treatment. However, if a printer chooses to treat the waste him/herself, there are additional requirements, including waste analysis plans, notifications, and certifications (Call the RCRA Hotline, your state agency, or EPA regional office.) In this instance, the printer would be operating as a TSDF, which requires extensive permitting and is NOT a good idea.

✓ With the initial shipment of waste to each designated TSDF, send a one-time written notice to each TSDF receiving the waste, and keep a copy in your files. This notice must include information regarding whether or not wastes meet treatment standards or whether the waste is excluded by the definition of hazardous or solid waste or is otherwise exempt.

Accident Prevention

✓ Be maintained and operated to minimize the possibility of a fire, explosion or other accident involving hazardous waste or hazardous waste constituents. All printers who are FQGs must be equipped with:
- an internal communication or alarm system capable of providing immediate emergency instruction (voice or signal) to all personnel;
- a device, such as a telephone (immediately available at the scene of operations) or a hand-held, two-way radio, capable of summoning emergency assistance from local police and fire departments or emergency response teams;
- portable fire extinguishers, fire control devices (including special extinguishing equipment, such as that using foam, inert gas, or dry chemicals), spill control materials, and decontamination supplies; and
- water at adequate volume and pressure to supply water hose streams, foam-producing equipment, automatic sprinklers, or water spray systems.

- ✓ **You Also Must:**
  - test and maintain all equipment to ensure proper operation;
  - allow sufficient aisle space to permit the unobstructed movement of personnel, fire protection equipment, spill control equipment, and decontamination equipment to any area of facility operation;
  - attempt to secure arrangements with fire departments, police, emergency response teams, equipment suppliers, and local hospitals, as appropriate, to provide services in the event of an emergency; and
  - ensure that personnel handling hazardous waste have immediate access to an alarm or emergency communications device.

Responding to Emergencies:

- ✓ Have at least one employee either on the premises or on call (i.e., available to respond to an emergency by reaching the facility within a short period of time) with the responsibility of coordinating all emergency response measures. This employee is the emergency coordinator.

- ✓ Post the following information next to the telephone:
  - a name and telephone number of the emergency coordinator;
  - the location of fire extinguishers and spill control material, and, if present, fire alarm; and
  - the telephone number of the fire department, unless the facility has a direct alarm

- ✓ The emergency coordinator or his designee must respond to any emergencies that arise. The applicable responses are as follows:
  - In the event of a fire, call the fire department or attempt to extinguish the fire using a fire extinguisher.
  - In the event of a spill, contain the flow of hazardous waste to the extent possible, and as soon as is practicable, clean up the hazardous waste and any contaminated materials and soil.
  - In the event of a fire, explosion, or other release which could threaten human health outside the facility, or when the printer has knowledge that a spill has reached surface water, the printer must immediately notify the National Response Center using their 24-hour toll free number, (800) 424-8802. The report must include the following information:
    - the name, address and US EPA Identification number of the printer;
    - date, time, and type of incident (e.g., spill or fire);
    - quantity and type of hazardous waste involved in the incident
    - extent of injuries, if any; and
    - estimated quantity and disposition of recovered materials, if any.

- ✓ Have a contingency plan designed to minimize hazards from fires, explosions, or any unplanned release of hazardous waste or constituents. A contingency plan usually answers a set of "what if" questions. For example:
  - What if there is a fire in the area where hazardous waste is stored?
  - What if I spill hazardous waste, or one of my hazardous waste containers leaks? A copy of the plan must be kept on site and an additional copy must be submitted to all state and local emergency services providers. FQGs must have an emergency coordinator on site or on call at all times to respond to emergencies.

- ✓ A copy of the contingency plan must be kept on site and submitted to all local police and fire departments, hospitals, and emergency response teams that may be called upon to provide emergency services.

Personnel Training

- ✓ provide training for facility personnel. This must include instruction in hazardous waste management procedures and emergency response. The training must be completed within 6 months from the start of their employment. The facility personnel must undertake an annual review of initial training.

Pre-Transport and Transport Requirements

- ✓ If you're sending your waste off site, send your waste only to a facility permitted to handle the waste. Check with NHDES Hazardous Waste Compliance Section at (603) 271-2942 to be sure the facility you select has all necessary permits.

- ✓ When shipping waste off-site, package, label, and mark your shipment, and placard the vehicle in which your waste is shipped as specified in DOT regulations. Most printers probably use a commercial transporter to ship hazardous waste. These transporters can advise you on specific requirements for placarding, labeling, marking, and packaging. However, you remain responsible for compliance. For additional information, call the DOT hazardous materials information line at (202) 366-4488.

- ✓ Prepare a hazardous waste manifest to accompany your shipment. A hazardous waste manifest is a multi-part form designed to track hazardous waste from generation to disposal. This form will help you track your waste during shipment and make sure it arrives at the proper destination. Obtain a manifest form from NHDES Reporting at (603) 271-2900.

- ✓ Fill in all parts of the manifest. The transporter signs the completed manifest when the shipment is accepted for transport. The facility operator at the designated TSDF also signs the form when the shipment is received and sends a copy back to the generator. You must keep this copy on file for three years.

Reporting

- ✓ If you do not receive a copy of the manifest from the receiving facility within 30 days of shipment, you are required as an FQG to contact the transporter and/or treatment, storage, and disposal facility to determine its status, and to submit an exception report within 45 days to NH DES.

- ✓ You are required to maintain uniform hazardous waste manifests, copies of Notification of Intent reports, and weekly storage container inspection records for 3 years.

- ✓ If your facility generates more than 300 kg of hazardous waste within 3 calendar months, you must submit quarterly reports to the NH DES.

Waste Minimization Certification

- ✓ Certify on your Hazardous Waste Manifest Form that you have a program in place to reduce the volume and toxicity of waste generated to the degree that it is determined to be economically practicable, and that you have selected a currently available method of treatment, storage, or disposal which minimizes the present and future threat to human health and the environment.

Record Keeping

- ✓ Keep records of test results, waste analyses and other hazardous waste determinations for at least 3 years.
- ✓ Keep personnel training records until the facility closes.
- ✓ Keep copies of your biennial report for at least 3 years.
- ✓ Keep copies of Exception Reports for at least 3 years.
- ✓ Keep your copy of the signed manifest for at least three years. If you have the copy that was signed and returned from the TSDF, retain that one instead for at least three years.

STOP: IF YOU ARE A
FULL QUANTITY GENERATOR
THAT GENERATES LESS THAN 1000 KG PER MONTH:

GO TO CHAPTER 6

Requirements for FQGs, > 1000 Kg/month

Contact the NHDES Hazardous Waste Compliance Section at (603) 271-2942 to review the additional requirements for this hazardous waste generator category.

CHAPTER 6:
Evaluating Air Emissions: Volatile Organic Compounds (VOCs)

The **CLEAN AIR ACT** (CAA) is the federal law which regulates air emissions from both stationary (e.g., factories) and mobile (e.g., vehicles) sources. Among other things, this law authorized the EPA to establish National Ambient Air Quality Standards (NAAQS) to protect public health and the environment. Regulations written to achieve NAAQS require that industrial facilities limit the amount of certain chemicals that they release to the air. For printers, the relevant regulations typically relate to volatile organic compounds (VOCs). VOC emissions lead to the formation of ground-level ozone or smog.

Introduction

Volatile organic compounds (VOCs) contribute to ground level ozone which is a health hazard. VOCs used at printing facilities are typically found in blanket and roller wash, screen cleaning solution, fountain solutions, heatset lithographic inks and solvent-based flexographic inks. Depending on the amount of these chemicals used, your facility will be placed into different "levels" for VOC emissions. These levels will determine your requirements.

Use Low Vapor Pressure Solvents

Printers should use the lowest vapor pressure solvents that allow them to operate the facility at an acceptable production level. Lower vapor pressure press washes will not evaporate as quickly as high vapor pressure washes.

Determining your PrintSTEP Air Level for VOCs

PrintSTEP has 5 "VOC Levels." Your facility's PrintSTEP VOC Level depends on your VOC emissions. You can choose one of two methods to determine your PrintSTEP VOC Level:

- The **Materials Use** method presented in this section is a simple method which allows you to estimate your PrintSTEP VOC Level based on the quantities of materials you use that may contain VOCs.

- The **Emissions Calculations** method presented in Appendix B allows you to calculate your air emissions more precisely and account for your efforts to reduce emissions, such as emissions control equipment. If you have such equipment and want credit for it in determining your VOC Level, you must use the Emissions Calculations method in Appendix E. The requirement to operate the emissions control equipment must be made enforceable in order to receive credit for the controls.

  Using the Materials Use Worksheet provided in this chapter, you can determine your facility's PrintSTEP VOC Level based on the quantities of materials you use. All you need to know is your facility's material usage for the last 12 months. By assuming that your air emissions result from using the materials identified on the Worksheet, the Materials Use method translates material use into air emissions and your corresponding PrintSTEP VOC Level. Therefore, this approach allows you to assess your facility's air emissions without doing complex calculations. If you would like more detailed information on the Materials Use method, see Appendix D.

  To determine your VOC Level, printers will need the following information:

  - records of materials used (e.g., purchasing and inventory records) within the past 12 months; and
  - material safety data sheets (MSDSs) and product data sheets for materials used at your facility.

  With this information, complete the Material Use Worksheet for your type of printing process.

Materials Use Worksheets

①	②	③
Printing Process	**VOC-containing Materials**	**Qty VOC-containing materials** used in the last 12 mo.
Sheetfed Or Non-Heatset Web Lithograph (No pollution control)	cleaning solvents	gals
		gals
		gals
	fountain soln additives	gals
		gals
	adhesives & coatings	gals
		gals
		gals
Screen Printing (No pollution control)	solvent-based inks	gals
		gals
		gals
	dilution & cleaning solvents	gals
		gals
		gals
	adhesives & coatings	gals
		gals

VOC Total

①	②	③
Printing Process	**VOC-containing Materials**	**Qty VOC-containing materials** used in the last 12 mo.
Heatset Web Offset lithography (No pollution control)	inks	lbs
		lbs
		lbs
	cleaning solvents	lbs
		lbs
	fountain soln additives	lbs
		lbs
	adhesives & coatings	lbs
Flexography or Rotogravure with water-based inks (No pollution control)	water-based inks*	lbs
		lbs
		lbs
	water-based coatings*	lbs
		lbs
		lbs
	water-based adhesives*	lbs
		lbs
		lbs
Flexography or Rotogravure with solvent-based inks (No pollution control)	inks	lbs
		lbs
		lbs
	dilution & cleaning solvents	lbs
		lbs
		lbs
	adhesives & coatings	lbs
		lbs

VOC Total

*** If your water-based materials contain more than 25% of the volatile fraction as VOC, you must use the "Flexography or Rotogravure with Solvent Inks" section.**

Materials Use Worksheet Instructions (see Appendix D for example)

COLUMN 1: Fill out the section of the Worksheet for the printing process at your facility only.

COLUMN 2: The listed types of materials are those that generate most of the VOC and emissions from the listed type of printing process. You do not need to include a listed type of material if you used less than 25 gallons of that type of material in the past 12 months. For example, if you used 1 gallon each of 30 different inks, your total use of this type of material (i.e., ink) would be more than 25 gallons and you would have to include it on your Worksheet.

COLUMN 3: For each type of material listed in Column 2, list the total quantity used in the last 12 months. Enter the total quantity of the material used regardless of the percentage content of VOCs. Be sure to enter the quantities ONLY in the units specified on the Worksheet. For example, screen printers will enter quantities in gallons only. If you need to convert a material quantity from gallons to pounds, multiply by the density of the material. If you need to convert from pounds to gallons, divide by the density (see MSDS). Density = specific gravity x 8.34 (lb/gal).

After completing the Materials Use Worksheet, determine your Air Level

Add up the pounds or gallons of VOC-containing material used (Column 3). Enter this total at the bottom of the Worksheet in the box labeled "VOC Total."

Now you use the Materials Use Worksheet totals to determine your PrintSTEP VOC Level. Using the appropriate Materials Use VOC Level Table below, find the Level associated with the total VOC-containing material you used, as recorded in the "VOC Total" box. Your level depends on what type of printing processes you use.

Material Use Level Table for VOCs

Check one:	Your VOC LEVEL is:
☐	VOC Level 1
☐	VOC Level 2
☐	VOC Level 3
☐	VOC Level 4
☐	VOC Level 5

Requirements for VOC Level 1

Materials Management

Complete the Air Level Worksheet (using either the Materials Use or Emissions Calculations Method) annually (on a calendar year basis) to assure that emissions do not exceed PrintSTEP VOC Level 1 thresholds.

Record Keeping

- Keep completed Air Level Worksheets on file.
- Keep annual materials usage records (on a calendar year basis) to demonstrate that the facility emissions qualify as VOC Level 1. This includes records of quantities of the materials listed on the VOC Level Worksheet, such as inks, cleanup solutions, fountain solution additives, coatings, and adhesives.
- Keep Material Safety Data Sheets (MSDSs) and product data sheets on file for materials used. Maintain records for 5 years.

Reporting

- The PrintSTEP application serves as a one-time notice of emissions, wastes, and releases, with no further reporting. If you exceed the Level 1 thresholds, you must submit a new PrintSTEP application to the state.
- If you are currently subject to additional reporting requirements, these requirements are still applicable under PrintSTEP.

Modifications

If you make modifications in your facility, see Chapter 10 for guidance on updating your PrintSTEP Notification.

Requirements for VOC Level 2

Materials Management

Complete the Air Level Worksheet (using either the Materials Use or Emissions Calculations Method) annually (on a calendar year basis) to assure that emissions do not exceed PrintSTEP Level 2 thresholds for VOCs.

Record Keeping

- Keep completed Air Level Worksheets on file.
- Keep annual materials usage records (on a calendar year basis) to demonstrate that the facility emissions qualify as VOC Level 2. This includes records of quantities of the materials listed on the Air Level Worksheets, such as inks, cleanup solutions, fountain solution additives, coatings, and adhesives.
- Keep Material Safety Data Sheets (MSDSs) and product data sheets on file for materials used.
- Maintain records for 5 years.

Reporting

An annual report must be submitted which documents compliance with VOC Level 2 thresholds. The report must also describe changes in facility operations which impacted emissions (increases or decreases).

Modifications

If you make modifications in your facility, see Chapter 10 for guidance on updating your PrintSTEP Agreement.

Requirements for VOC Level 3

Facilities in VOC Level 3 will have practically enforceable limitations imposed through PrintSTEP Agreements which keep their actual and potential VOC emissions below VOC Level 3 thresholds and thus major source thresholds for these pollutants. VOC Level 3 facilities will not be considered major sources for these pollutants due to their potential to emit.

Materials Management

Complete the Air Level Worksheet (using either the Materials Use or Emissions Calculations Method) annually to assure that emissions do not exceed PrintSTEP VOC Level 3 thresholds.

Monitoring/Testing

- In the event of a "permit deviation," the facility shall investigate and take corrective action immediately upon discovery of the permit deviation to restore the affected device, process, or air pollution control equipment to within allowable permit limits.

- If you are currently subject to additional requirements, such as limits on VOC content of inks or monitoring or control equipment, these requirements are still applicable under PrintSTEP.

Record Keeping

- Keep completed Air Level Worksheets on file.
- Keep materials usage records on a rolling 12-month basis sufficient to demonstrate that the facility emissions do not exceed VOC Level 3 thresholds. This includes records of quantities of the materials listed on the Air Level Worksheets, such as inks, cleanup solutions, fountain solution additives, coatings, and adhesives. For facilities using the Emissions Calculations Method materials content information must be maintained.
- Keep Material Safety Data Sheets (MSDSs) and product data sheets on file for materials used.
- Maintain records for 5 years.

Reporting

- An annual report must be submitted which documents compliance with VOC Level 3 thresholds, including the actual emissions, methods used in calculating the emissions, and the actual annual emissions speciated by individual regulated air pollutants, including a breakdown of VOC emissions by compound.
- The report must also describe changes in facility operations that impacted emissions (increases or decreases).
- The annual report must be submitted by April 15 of the following year. For example, the emissions report for calendar year 2000 shall be submitted by April 15, 2001.

Modifications

If you make modifications in your facility, see Chapter 10 for guidance on updating your PrintSTEP Agreement.

Requirements for VOC Level 4

Facilities in VOC Level 4 will have practically enforceable limitations imposed through PrintSTEP Agreements which keep their actual and potential VOC emissions below VOC Level 4 thresholds and thus below major source thresholds for these pollutants. Accordingly such facilities will not be considered major sources for these pollutants due to their potential to emit.

Materials Management

- Complete the Air Level Worksheet (using either the Materials Use or Emissions Calculations Method) annually to assure that emissions do not exceed PrintSTEP VOC Level 4 thresholds.

- Incorporate into the PrintSTEP Agreement any printing specific requirements that apply to the facility (e.g., limits on inks, coatings, other materials, cleaning solvents and performance requirements for add-on controls).
- The PrintSTEP Agreement can express the limits for lithographic blanket wash and other cleaning solvents in terms of vapor pressure (e.g., 10 mmHg @ 20°C).
- The PrintSTEP Agreement should explicitly specify the extent (time frame, equipment, and materials) to which averaging is allowed for demonstrating compliance (e.g., all inks used each month in the facility).

Monitoring/Testing

- For emissions caps, you should assure compliance with total emission limits based on an approved method of measuring material use and content, production rate, and/or operational parameters for specific emission units.
- Use EPA Method 24A only for publication rotogravure inks and related publication rotogravure coatings. Use Method 24 for all other inks, coatings, and adhesives.
- When using Method 24 on waterborne materials, use the precision adjustments when determining compliance of individual materials. When averaging materials or counting total mass emissions, do not adjust below formulation VOC content.
- For purposes of ink oil capture, the dryer should be operated at negative pressure instead of requiring heatset web offset printers to perform capture efficiency testing.
    - When counting facility emissions (mass per time), use the features specified in the emission calculations in Appendix E of the *Plain Language Workbook:*
    - 95% ink oil retention for non-heatset sheetfed and web offset lithographic inks;
    - 20% ink oil retention for heatset web offset lithographic inks;
    - 70% carryover of alcohol substitute fountain solution additive to dryer for controlled heatset web lithographic presses;
    - 40% carryover of low vapor pressure (less than 10 mmHg @20°C) automatic blanket wash through a control device to dryer for lithographic printing;
    - 50% retention of low vapor pressure (less than 10 mmHg @20°C) cleaning solvent in shop towels for lithographic printing as long as used towels are kept in closed containers.

Record Keeping

- Keep completed Air Level Worksheets on file.
- Keep materials usage records on a rolling 12-month basis sufficient to demonstrate that the facility emissions do not exceed VOC Level 4 thresholds. This includes records of quantities of the materials listed on the Air Level Worksheets, such as inks, cleanup solutions, fountain solution additives, coatings, and adhesives. For facilities using the Emissions Calculations Method, materials content information must be maintained.
- Keep Material Safety Data Sheets (MSDSs) and product data sheets on file for materials used.

- Maintain records for 5 years.

Reporting

- An annual report must be submitted which documents compliance with VOC Level 4 thresholds, including the actual emissions, methods used in calculating the emissions, and the actual annual emissions speciated by individual regulated air pollutants, including a breakdown of VOC emissions by compound.
- The report must also describe changes in facility operations that impacted emissions (increases or decreases).
- The annual report must also include the following information:
    - Facility information, including the following:
        - Source name;
        - Standard industrial Classification (SIC) code;
        - Physical address; and
        - Mailing address;
    - Identification of each VOC-emitting process or device;
    - Operating schedule during the high ozone season for each VOC-emitting process or device, including the following information:
        - Hours of operation per calendar day; and
        - Days of operation per calendar week.
    - Total quantities of actual VOC emissions for the entire facility and for each process or device, including the following:
        - Annual VOC emissions, in tons; and
        - Typical high ozone season day VOC emissions, in pounds per day.
    - The information for each printing press or device required to be recorded as listed above.
- The annual report must be submitted by April 15 of the following year. For example, the emissions report for calendar year 2000 shall be submitted by April 15, 2001.

Modifications

If you make modifications in your facility, see Chapter 10 for guidance on updating your PrintSTEP Agreement.

Requirements for VOC Level 5

Facilities in VOC Level 5 are considered Major Sources for VOC emissions and require a Title V operating permit from the NHDES. Contact the NHDES Air Resources Division at (603) 271-6793 for additional information.

CHAPTER 7:
Evaluating Air Emissions: NH Regulated Toxic Air Pollutants (RTAPs)

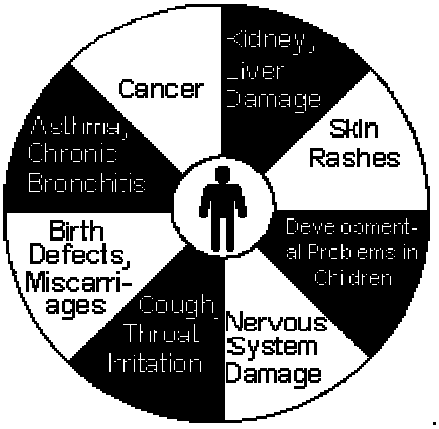
The **NH Air Toxics Control Program**, originally enacted in 1987 and revised in 1996, protects public health by reducing human exposure to toxic air pollutants. For printers, air toxics may be used in blanket and roller washes, fountain solutions, and developer solutions.

What are Toxic Air Pollutants?

Toxic air pollutants are those pollutants that, at sufficient concentrations and exposure, are known or suspected to cause cancer or other serious health effects, such as reproductive effects or birth defects, or to cause adverse environmental effects. In general, the toxic air pollutants which are of greatest concern are those that are released to the air in large enough amounts to create a risk to human health, and have the potential to reach many people.

What are the Effects of Toxic Air Pollutants?

The emission of toxic pollutants into the air can have serious effects to human health and the environment. Human exposure to these pollutants can include both short-term (acute) and long-term (chronic) complications. Many factors can affect how different toxic air pollutants may impact human health, including the quantity which a person is exposed to, the duration and frequency of the exposure, the toxicity level of the pollutant, and the person's overall health and level of resistance or susceptibility. Short-term exposures can include effects such as eye irritation, nausea or difficulty in breathing. Long-term exposures to many air toxics may result in damage to the respiratory or nervous systems, birth defects, and reproductive effects. In addition, toxic air pollutants can have indirect effects on human health through deposition onto soil or into lakes and streams, potentially affecting ecological systems and eventually human health through consumption of contaminated food.



New Hampshire's Air Toxic Rule: Env-A 1400

To protect New Hampshire residents from the affects of toxic air pollutants, the New Hampshire Air Toxics Control Program was enacted in 1987 and revised in 1996. The program is codified in NH RSA Chapter 125-I Air Toxics Control Act and in NH Code of Administrative Rules Chapter Env-A 1400 Regulated Toxic Air Pollutants.

Env-A 1400 regulates the emissions of 750 regulated toxic air pollutants (RTAPs) which have a health-based risk to humans and are likely used by business and industry in the state. The regulation affects all stationary sources which may emit any of the 750 RTAPs in the ambient air. The aim of the regulation is to protect public health and the environment by establishing ambient air limits (AALs) and requiring businesses in the state to reduce their emissions of any of the 750 listed RTAPs such that they do not impact the downwind air quality at levels that may exceed the established AALs. The entire list of 750 RTAPs is located in Appendix F.

Where do Printers Typically use RTAPs?

RTAPs may be used in printing facilities in a number of places: fountain solutions, blanket and roller washes, meter roller cleaners, screen cleaning solutions, some inks, and pre-press chemistry such as developer and fixer. To determine if you use any RTAPs, look at the material safety data sheets (MSDS) under the section labeled "Hazardous Ingredients" (typically found in Section II). Examples of some commonly used RTAPs are listed in the table below.

Examples of RTAPs Used at Printing Facilities

Source	RTAP Name	CAS #
Fountain Solutions	Isopropanol	67-63-0
	2-Butoxyethanol	111-76-2
	Ethylene Glycol	107-21-1
	Acetic Acid	64-19-7
Blanket & Roller Washes, Cleaning Solutions	Cumene	98-82-8
	1,2,4-Trimethylbenzene	95-63-6
	Xylene	1330-20-7
	Ethyl Benzene	100-41-4
	Ethanol	64-17-5
	Toluene	108-88-3
	Cyclohexane	110-82-7
	Naphthalene	91-20-3
Meter Roller Cleaner	Methylene Chloride	75-09-2
	Acetone	67-64-1
	Xylene	1130-20-7
	Methylpyrrolidone	872-50-4
Lithographic Inks	Barrium	7440-39-3
	Zinc	7440-66-6
Screen Inks	2-Butoxyethanol	111-76-2
	2-Butoxyehtanol Acetate	112-07-02
	Titanium Dioxide	13463-67-7
	Barrium Sulfate	7727-43-7
	Carbon Black	1333-86-4
	Lead	7439-92-1
Developer & Fixer	Hydroquinone	123-31-9
	Phosphoric Acid	7664-38-2

Material Substitution

After you have determined that your facility uses products that contain RTAPs, the next step is to evaluate if another product may be used that contains either no RTAPs or RTAPs at lower concentrations than the existing product. Here are some examples:

Cleaning Solutions: Vendors provide many products used for cleaning presses or screens. You should work with your vendor to choose a product with lower percentages of RTAPs. Also, you should avoid products that contain high percentages of Toluene or Xylene. Typically, cleaning solutions with vapor pressures below 10 mmHg will have lower amounts of RTAPs.

Fountain Solutions: Alcohol substitutes typically contain RTAPs such as 2-Butoxyethanol and Ethylene Glycol. You will not be able to eliminate these chemicals, however, you may be able to find a substitute that contains lower percentages of these chemicals.

Meter Roller Cleaner: Many vendors have products with names such as "Low VOC MRC" or "Low HAP MRC". You should change to one of these products if your current meter roller cleaner contains Methylene Chloride. Also, make sure your facility is not overusing MRC when a Blanket or Roller Wash can be used. Typically Blanket and Roller Washes contain fewer amounts of RTAPs than meter roller cleaners.

Screen Inks: Solvent-based screen inks contain products such as 2-butoxyethanol or 2-butoxyethanol acetate which are both RTAPs. Although not an easy change, alternate screen inks should be evaluated such as water-based or UV-curable which typically contain lower percentages of RTAPs.

How do you Determine Compliance with Env-A 1400?

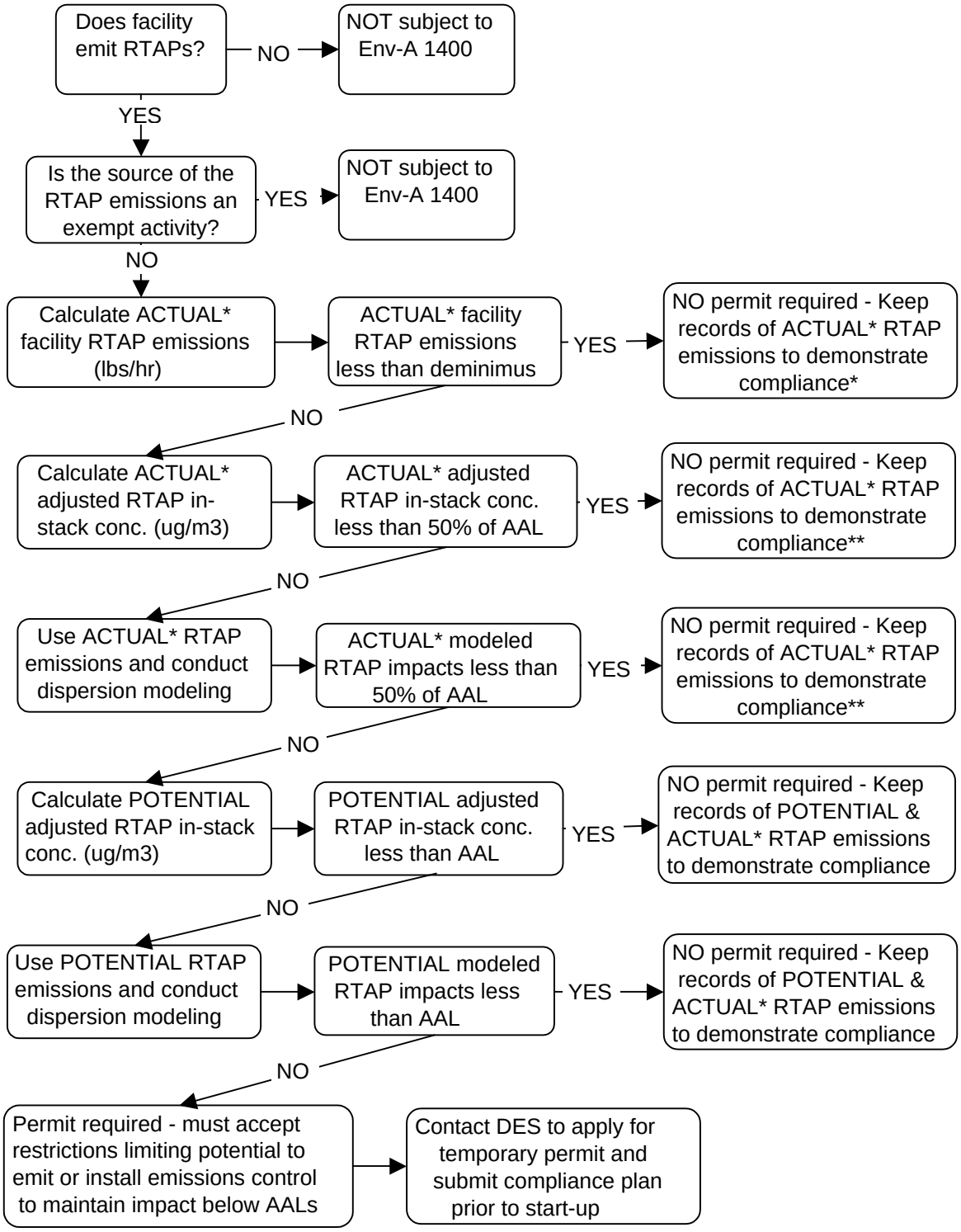
The NHDES has given facility's three ways to determine compliance with the Air Toxics Rule, Env-A 1400. Each way is more complex than the next. The basis for these determinations is to ensure that the ambient air levels (AALs) for each RTAP are not exceeded at the property boundary. Short-term (24-hr) and long-term (annual) AALs were established based on current scientific literature and are the basis for each of the three compliance methods. The three methods are as follows:

- De minimus calculations: Set levels based on material usage amounts for each RTAP.
- In-Stack Concentration Method: Assumes that if the RTAP concentration in the stack is below the AAL for that RTAP that there is no way the AAL can be exceeded at the property boundary.
- Air Dispersion Modeling: Computer modeling calculations based on several factors including material usage amounts, stack location, stack height, distance to property boundary, fan size, etc. This calculation must be determined either by the NHDES or a qualified environmental consultant.

Calculations may be based on "actual" facility usage data using the flow chart on the following page:

Env-A 1400 Compliance Determination Flow Chart

(revised 6/15/01)



* Note that ACTUAL emissions are UNCONTROLLED emissions.

** Note that even when a source can use actual emissions to demonstrate compliance with Env-A 1400 under this policy, it may still be necessary to calculate potential emissions of other pollutants to determine the applicability of other regulations such as VOC RACT, Title V, Title III, etc.

De Minimus Emission Level Method

The NHDES has developed worksheets that assist with the compliance determination using the de minimus emission level method. These worksheets are on pages 7-6 through 7-8.

Worksheet 1: Assists you with determining what RTAPs are currently used at the facility. To complete this worksheet you will first need to obtain material safety data sheets (MSDSs) for chemical products used at your facility.

After obtaining the MSDSs, review the "Hazardous Ingredients" section of each MSDS to determine if any of the chemical constituents of the product are considered RTAPs. Since many individual chemicals may have more than one name, you should check the RTAP list by the Chemical Abstracts Service (CAS) number. Each chemical only has one CAS number.

If any chemicals listed on the MSDS are on the RTAP list (see Appendix E), you should list product and the RTAP on Worksheet 1. Do this for each MSDS for products that you use.

Worksheet 2 & 3: Assists with the emissions calculations for each RTAP. You should complete Worksheets 2 & 3 for each RTAP that is used at your facility. To complete these worksheets you will need the following:

- MSDS for each product that contains a RTAP.
- Usage amounts or purchase records for the past 12 months for each product that contains a RTAP.

After Completing the Three Worksheets for Each RTAP:

- Check the calculated annual de minimus and 24-Hour de minimus with the de minimus levels for the RTAP located in Appendix F.

- If both calculated de minimus levels are below the Appendix F de minimus levels for each RTAP, your determination is complete. Your RTAP level is 1, and no permit is required. Go to Chapter 8.

- If your calculations have exceeded the Appendix E de minimus levels for any RTAP, submit the completed Worksheets 1, 2 & 3 with your PrintSTEP Application and the NHDES will determine your Env-A 1400 compliance status for you. Continue to Chapter 8. Your RTAP level will be determined by NHDES. Facilities that do not require permit conditions are considered RTAP Level 1. Facilities that require RTAP permit conditions are considered RTAP Level 2.

Worksheet 1

Env-A 1400 Emissions Compliance Worksheet
Determination of Regulated Toxic Air Pollutants (RTAPs) Used

Facility Name: _____ Primary Business: _____
Address: _____ Telephone: _____
_____ Contact: _____
Material Usage Basis: MSDS ☐ AP-42 ☐ Other ☐ Title: _____

Material Used	Product ID	Compound	CAS Number	Information Source*	RTAP (Y/N)	Emission Point

* If information is from MSDS, attach copies. If information is from another source, please identify and attach documentation.

Worksheet 2

Env-A 1400 Emissions Compliance Worksheet
Determination of RTAP Fate and Emissions

Facility Name: _____ Primary Business: _____
Address: _____ Telephone: _____
_____ Contact: _____
Title: _____

				A	B	C=(A*B)/100			D	E=(C*D)/100
Material / Product ID	Use Location*	RTAP	CAS Number	Product Density (lb/gallon)	RTAP Percentage (% by weight)	RTAP Density (lbs/gal)**	Is 100% of RTAP Emitted? (Y/N)	If RTAP is NOT fully emitted - decribe RTAP fate***	Proportion Emitted (% by weight)	Corrected RTAP Density (lbs/gal)****

* Use Location: Describe where the product is used and/or emitted. List product at each location where it is used.
Examples: "spray booth #2" or "off-set press #1" or "roof vent".

** RTAP concentration (lb/gal) = product density (in lb/gal) times % RTAP by weight given on Material Safety Data Sheet divided by 100:
Example: Product density: 8.5 lb/gallon, 10% xylene by weight.
==> RTAP (lb/gal) = (8.5)*(10)/100 = 0.85 lb/gal xylene

*** If RTAP is not emitted ito the air, describe its fate.
Example: "Titanium dioxide is a non-volatile component of the pigment in coating # 1444. Since it is roller-applied, 100% is retained on the product to which it is applied".

**** Portion of RTAP that would be emitted after subtracting out portion that would be retained. This value should be used to calculate air emissions (Worksheet 3).
Example: "Titanium dioxide is a non-volatile component of 'the pigment in coating # 1444. Since it is applied with an HVLP spray gun, 60% is retained on the product to which it is applied and 40 % is emitt
==> In this case, the lb/gal RTAP content would be multiplied by 0.4 to obtain the corrected RTAP lb/gal content.

Worksheet 3

Env-A 1400 Emissions Compliance Worksheet

RTAP Emissions and Compliance Determination: Deminimus Emission Level Method

Facility Name: _____ Primary Business: _____

Address: _____ Telephone: _____

_____ Contact: _____

Title: _____

Compliance Basis: Actual ☐ Potential* ☐ Other* ☐

Pollutant: _____

CAS#: _____

		A	B	C	D	E=A*D		F=C*D		
Product ID	Use Location	Maximum Use Rate** (gal/hr)	Maximum Use Rate** (hrs/day)	Maximum Use Rate** (gal/yr)	Corrected RTAP (lbs/gal) (From Worksheet 2)	Maximum Emissions*** (lbs/hr)	24-hr Deminimus (lbs/hr)	Maximum Emissions (lbs/yr)	Annual Deminimus (lbs/yr)	Exceeds Deminimus? (Y/N)
TOTALS:										

* Potential emissions are based on full operation 24-hrs/day, 365 days/yr. Explain if "other" is checked.

** Maximum Use Rate - List the "worst case", maximum possible use rate of the product at this location to calculate maximum RTAP emissions.

*** Maximum, uncontrolled 24-hr average lbs/hr emission rate is calculated by dividing maximum, uncontrolled lbs/day by 24bhrs/day.

CHAPTER 8:

Evaluating Air Emissions: Hazardous Air Pollutants (HAPs)

The **CLEAN AIR ACT** (CAA) is the federal law which regulates air emissions from both stationary (e.g., factories) and mobile (e.g., vehicles) sources. Among other things, this law authorized the EPA to establish National Ambient Air Quality Standards (NAAQS) to protect public health and the environment. Regulations written to achieve NAAQS require that industrial facilities limit the amount of certain chemicals that they release to the air. The CAA also requires EPA to set limits on selected hazardous air pollutants, or HAPs. The list of HAPs is located in Appendix F. For printers, HAPs will be found in the same chemicals that RTAPs are found (see chapter 7): blanket and roller washes, fountain solutions, developer solutions, and other miscellaneous chemicals.

Hazardous Air Pollutants

The EPA has designated 188 chemicals and chemical compound groups as Hazardous Air Pollutants (HAPs) due to their toxicity to humans and effects on the environment. In Chapter 7, New Hampshire Regulated Toxic Air Pollutants (RTAPs) were discussed. Every chemical designated a HAP by EPA is also a RTAP under the NHDES rule Env-A 1400.

The worksheets that you completed for determining the de minimum calculations in Chapter 7 will assist you with the determination of your HAP emissions.

HAPs emissions are regulated in two ways:

- By individual HAP, and
- By total facility-wide HAP emissions. This is determined by adding the sum of each individual HAP together.

Hazardous Air Pollutants (HAP) Air Levels

TOTAL Facility-wide HAP Emissions (pounds/year)	Individual HAP Emissions (pounds/year)		**HAP Air Level**
less than 25,000	less than 10,000	➔	Level 1
25,000 < 50,000	10,000 < 20,000	➔	Level 2
50,000 or more	20,000 or more	➔	Level 3

Determining the HAP Air Level for the Facility

From Chapter 7, review your completed Worksheet 1. Cross reference the RTAPs that you emit with the list of HAPs located in Appendix G. For each HAP on your Worksheet 1, review the completed Worksheet 3. From Worksheet 3, Column F, your facility's actual emissions for that RTAP/HAP has been determined. From each of the Worksheet 3's, complete the following table:

Hazardous Air Pollutant Emission Determination		
Hazardous Air Pollutant (HAP) Name	**CAS #**	**Annual Emissions, Pounds/Year (Worksheet 3, Column F)**
Total HAP Emissions		

From this table, compare your Individual HAP Emissions (pounds/year) and your Total HAP Emissions (pounds/year) with the HAP Level described on the previous page. Use either the Total HAP Emissions or the highest Individual HAP Emissions for your HAP Air Level determination.

This is your HAP Air Level	➢➢		

The three HAP Air Levels have different requirements, complete the requirements for your determined level.

HAP Air Level 1 Requirements

1. **Required Calculations:** Worksheets 1, 2 & 3 on an annual basis. These are required to assure that Level 1 thresholds are not exceeded.
2. **Recordkeeping:**
   - Completed Worksheets 1, 2, & 3 on file
   - Maintain annual usage or purchase records for each product.
   - Maintain MSDSs for each product.
   - Keep these records on-site for 5 years.
3. **Reporting:** If your facility HAP Air Level changes to a higher level, your facility must resubmit a completed PrintSTEP Application.
4. **Public Involvement**: None required.

HAP Air Level 2 Requirements

1. **Required Calculations:** Worksheets 1, 2 & 3 on an annual basis. These are required to assure that Level 2 thresholds are not exceeded.
2. **Facility Limitations:** Maintain all facility limitations outlined in your PrintSTEP Agreement issued by the NHDES.
3. **Recordkeeping:**
   - Completed Worksheets 1, 2, & 3 on file
   - Maintain annual usage or purchase records for each product on a rolling 12-month basis.
   - Maintain MSDSs for each product.
   - Keep these records on-site for 5 years.
4. **Reporting:** If your facility HAP Air Level changes to a higher level, your facility must resubmit a completed PrintSTEP Application.
5. **Public Involvement:** Limited Public Participation

HAP Air Level 3 Requirements

Facility is considered a Major Source for Hazardous Air Pollutants and must receive a Title V Air Permit from the NHDES. Contact the Air Resources Division at 603-271-6793 for assistance.

CHAPTER 9:
The PrintSTEP Application Process

Submitting Your PrintSTEP Application

After completing Chapters 1 through 8, you are now ready to submit your PrintSTEP Application. Complete the following:

- ⇨ Using the waste water, storm water, hazardous waste, and air emissions worksheets (or tables) you just checked off, complete the PrintSTEP application form in Appendix I.

- ⇨ Remember to consider future growth. For example, if you are currently a Small Quantity Generator but you are very close to being a Full Quantity Generator, you may want to consider putting Full Quantity Generator on your PrintSTEP application.

- ⇨ Send the completed application to the State agency at:

New Hampshire Department of Environmental Services
PrintSTEP Program
6 Hazen Drive, P.O. Box 95
Concord, NH 03302-0095

PrintSTEP Information Repository

After the NH DES receives your PrintSTEP application, the completed application will be considered a public document and stored in information repositories located throughout the state.

- ⇨ The state will review your application upon receipt. If there are incomplete sections or errors, the NH DES will contact you for more information.
- ⇨ If everything is in order on your application, the state will file a copy in the PrintSTEP Information Repository.

PrintSTEP Information Repositories
The public can review copies of the application that a printer submits to the state (other than confidential business information) through the PrintSTEP "Information Repository." The purpose of the Repository is to help make the PrintSTEP process understandable and accessible to everyone. The Repository will also include copies of all public notices related to PrintSTEP. This Repository will be located at an accessible location, such as a local library or town hall. When modifications are made to an application, the state will update the repository. Call the NH DES at 1 888-270-0244 to find out about the PrintSTEP Repository.

PrintSTEP Notification Status

If you qualify for a PrintSTEP Notification status, there are no additional requirements associated with your PrintSTEP application. Also, the only public participation will be the document on file at the information repositories.

You qualify for a

PRINTSTEP NOTIFICATION if:

- You discharge **process WASTE WATER** to a POTW (less than 25,000 gallons per day) ***or***
- You are on a POTW with no discharge ***or***
- You are on a septic system with no discharges

AND

- You do not generate **HAZARDOUS WASTE *or***
- You're a Small Quantity Generator of hazardous waste ***or***
- You're a Full Quantity Generator (less than 1000 kg per month) of hazardous waste

AND

- Your **STORM WATER** is considered "No exposure"

AND

- Your **AIR EMISSIONS are the following:**
  VOC: Level 1 or 2; RTAP: Level 1; and HAP: Level 1.
-

Congratulations! You are now a PrintSTEP Printer.

You must now operate your facility within the thresholds of PrintSTEP Notification status and comply with all requirements.

STOP: IF YOU QUALIFY FOR PRINTSTEP NOTIFICATION STATUS, GO TO CHAPTER 10

IF YOU FALL UNDER THE PRINTSTEP AGREEMENT, CONTINUE WITH THIS CHAPTER

You will get a

PRINTSTEP AGREEMENT if:

- You discharge **process WASTE WATER** to a POTW (more than 25, 000 gal/day) ***or***
- You require an Individual NPDES permit for your process waste water

OR

- You're a Full Quantity Generator (more than 1000 kg per month) of **HAZARDOUS WASTE**

OR

- You require a NPDES General permit for **STORM WATER**

OR

- Your **AIR EMISSIONS (VOC, RTAP, or HAP)** are PrintSTEP Level 3, 4, or 5

Public Participation in PrintSTEP

This is the Step where the public can get involved in the PrintSTEP process. While, PrintSTEP lays out the process for this public involvement, ultimately it is up to the public whether or not they choose to get involved. If they do not participate, the process moves forward.

In PrintSTEP, your public involvement requirements correspond to your potential environmental impact. Printers who qualify for a PrintSTEP Notification (those with the lowest emissions or wastes in all media) do not have requirements for public involvement. However, your application will be available to the public through the Information Repository. Those printers with moderate emissions

have "Limited Public Involvement" requirements. And, printers with the greatest releases have "Full Public Involvement" requirements. Determine your Public Involvement requirements using the worksheet below.

Public Involvement Requirements Worksheet

check your status in each row	**NO Public Involvement**	**LIMITED Public Involvement**	**FULL Public Involvement**
Waste Water	□ POTW discharge and not a Significant Industrial User □ "No exposure"	□ POTW dischargers > 25,000 gal/day	□ NPDES Individual permit
Storm Water	□ NPDES General permit □ Exempt		
Hazardous Waste	□ no hazardous waste generation □ . Small Quantity Generator □ Full Quantity Generator, < =1000 kg/month	□ Full Quantity Generator, > 1000 kg/month	
Air Emissions, VOC	□ VOC Level 1 □ VOC Level 2	□ VOC Level 3	□ VOC Level 4 □ VOC Level 5
Air Emissions, RTAP	□ RTAP Level 1 (no permit)	□ RTAP Level 2 (permit)	
Air Emissions, HAP	□ HAP Level 1	□ HAP Level 2	□ HAP Level 3

To Determine Your Public Involvement Requirements:

- In each row, check off the status at your facility for the waste stream listed.
- If all your check marks are in the No Public Involvement column, you have no public involvement requirements.
- If you have **any** check marks in the Limited column, but none in the Full column, you have Limited Public Involvement requirements.
- If **any** of your check marks are in the Full column, you have Full Public Involvement requirements.

An Example: ABC Printing Company

- Continuing with the previous example from the ABC Printing Company, they would use the worksheet to determine their requirements for Public Involvement.
- They are a Full Quantity Generator of >1,000 kg/month of hazardous waste, therefore, they will have requirements for Limited Public Involvement.
- ABC Printing's application will be available for public review through the Information Repository.
- Note that **all** PrintSTEP applications, regardless of whether or not the printer has public involvement requirements, will be available to the public through the Information Repository.

How the Public will be Involved

The public is notified of your application and asked to comment on it, and possibly to attend a public meeting. *How* the public will be notified depends on whether you have Limited or Full Public Involvement requirements.

The PrintSTEP public participation mirrors existing NHDES requirements for printers that require permits. If you do not join PrintSTEP you will still have public participation requirements.

General Public Notice

General Notice indicates notice that is readily available and accessible to the public, so that anyone interested can find out about the PrintSTEP application. For example, a General Notice may be published in a newspaper or on the Internet. This type of notice is required as part of Limited and Full Public Involvement requirements.

Actual Public Notice

Actual Notice and General Notice are required as part of Full Public Involvement requirements. Actual Notice is when the community and registered parties are notified directly. Actual Notice may be done by hanging a sign at the facility. The PrintSTEP registry will be notified by first-class mail. See Chapter 11 for more information on how these guidelines are set.

PrintSTEP Registry

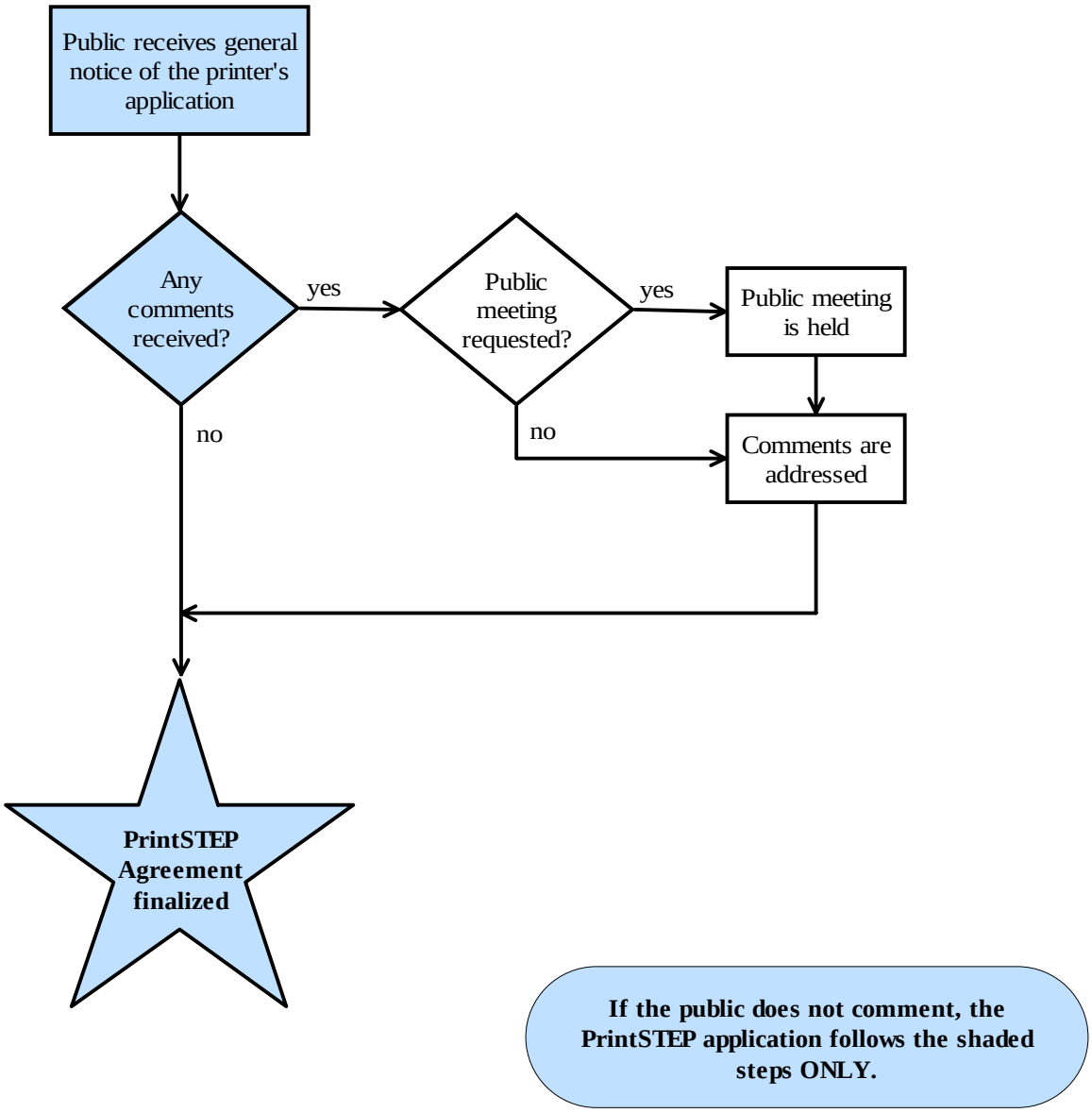
Anyone interested in the PrintSTEP process can register their name with the State. Whenever a PrintSTEP application is submitted that has public involvement requirements, appropriate registered parties will be notified about the application. Notification of registered people is *in addition to* the notification of community members. When registering, interested parties can specify if they want notification for all facilities, or only for those in a certain geographic area. Contact the NH DES at 1-888-270-0244 to register in New Hampshire.

Printers with Limited Public Involvement Requirements

See Figure 2 for an overview of the Limited Public Involvement process.

Figure 2

LIMITED Public Involvement Requirements



Printers with Limited Public Involvement Requirements (con't)

The Public Receives Notice of the Application

The public will get General Notice of your application. (Actual Notice is not required for Limited Public Involvement.) General Notice will be provided by the NH Department of Environmental Services. The notice shall be published once in a newspaper of general daily statewide circulation and placed on the internet at www.des.state.nh.us/printstep/. In addition, a copy of the notice will be sent to the applicant, an appropriate official of the city or town where the facility is (or would be) located, the local health officer, the Chamber of Commerce, and the regional planning agency. The public notice shall contain the following information: 1) name and address of applicant; 2) The location of the site or proposed site; 3) A brief description of the facility and processes; 4) The location and address where written comments and/or requests for a public meeting[1] shall be filed.

The Public Comments on the Application

What will the public comment on? The notice will ask the community and registered parties to comment on your PrintSTEP application. The public will have 30 days to submit comments to the NH Department of Environmental Services. These comments will address whether your application accurately describes your facility's environmental impact. The public can comment on any part of the application, not just the waste stream that triggered your public involvement requirements. Comments may also address issues such as sensitive environmental conditions or populations in the area, or the community may request that the state hold a public meeting to discuss the printers application. Copies of the application will be available through the PrintSTEP Information Repository. The standard regulatory requirements for each waste stream (as listed in Step 1 of this chapter) will also be available for public review from the Information Repository. These requirements will be the basis for your PrintSTEP Agreement. Community members are encouraged to review these requirements when deciding if they will comment. Written comments will be posted on the PrintSTEP internet site.

[1]PrintSTEP public "meeting" includes the term "hearing" as defined by New Hampshire RSA 125C.

What if the community needs more information or time*?* During the comment period, the community members may want to call you or the state agency to get more information or ask questions. This informal communication is a great opportunity for you to discuss and understand their questions or concerns. The community can also request an extension of the comment period from the state.

What happens after the comment period ends*?* Comments are reviewed by the state environmental agency. If no comments are received, the state will go ahead and finalize the PrintSTEP Agreement. If comments are received, they will be reviewed by the NHDES and the community to address any issues or conflicts. To do this, the state may hold a public meeting[1]. You can also make changes to your application to address comments.

A Public Meeting May Be Held

Why would there be a meeting*?* A meeting provides an opportunity for you to discuss and resolve any comments in an open forum with members of the community and the state. If, based on the comments, the state determines a public meeting is needed, the state agency will arrange the meeting. The public will be notified about this meeting by notice. A notice shall be published once, at least 30 days prior to the hearing, in a newspaper of general circulation in the immediate area in which the site is or would be located.

What will be discussed at the meeting*?* The goal of the meeting is to work together with the state agency and community members to address everyone's concerns. This meeting focuses only on your PrintSTEP application, and not on overall environmental issues in the community such as traffic congestion, noise, odors, or overall cumulative impacts. While these issues can be very important to a community, they probably cannot be addressed by one printer alone. However, the regulatory agency, possibly with your help, can assist the community to find out who to contact for help on such topics.

Keep in mind that PrintSTEP encourages a dialogue among all parties so that issues can be raised and addressed in a way that meets everyone's needs. Hopefully, the PrintSTEP Agreement will be agreeable to everyone. If any issues remain unresolved, the state will make the final decision on the printer's PrintSTEP Agreement.

[1]PrintSTEP public "meeting" also includes the term "hearing" as defined by New Hampshire RSA 125C.

Printers with Full Public Involvement Requirements

See Figure 3 for an overview of the Full Public Involvement requirements. Full Public Involvement requirements are similar to those for Limited Public Involvement, but require both general and actual public notice and an extra round of review.

The Public Receives Notice and Comments on the Application

As in Limited Public Involvement, the public will receive notice of your application and, if interested, can submit comments. In addition to General Notice, Actual Notice will be provided to the community and registered parties. A copy of the published notice will be sent to the applicant, EPA, an appropriate official of the city or town where the facility is (or would be) located, the local health officer, the regional planning agency, the Federal Land Manager, and persons on a mailing list (PrintSTEP Registry) developed by NHDES which includes all persons who request in writing to be on the list. In addition to the information required for a General Notice, the public notice shall contain the following information: The name, address, and phone number of the person to be contacted for further information; 2) A statement that any person may request a public meeting and an explanation of how to request such a meeting; 3) The number of allowances authorized pursuant to 40 CFR 73.10 (b) for any acid rain affected source; 4) The name and address of the permitting authority; and 5) The identity of the source.

A Public Meeting May be Held

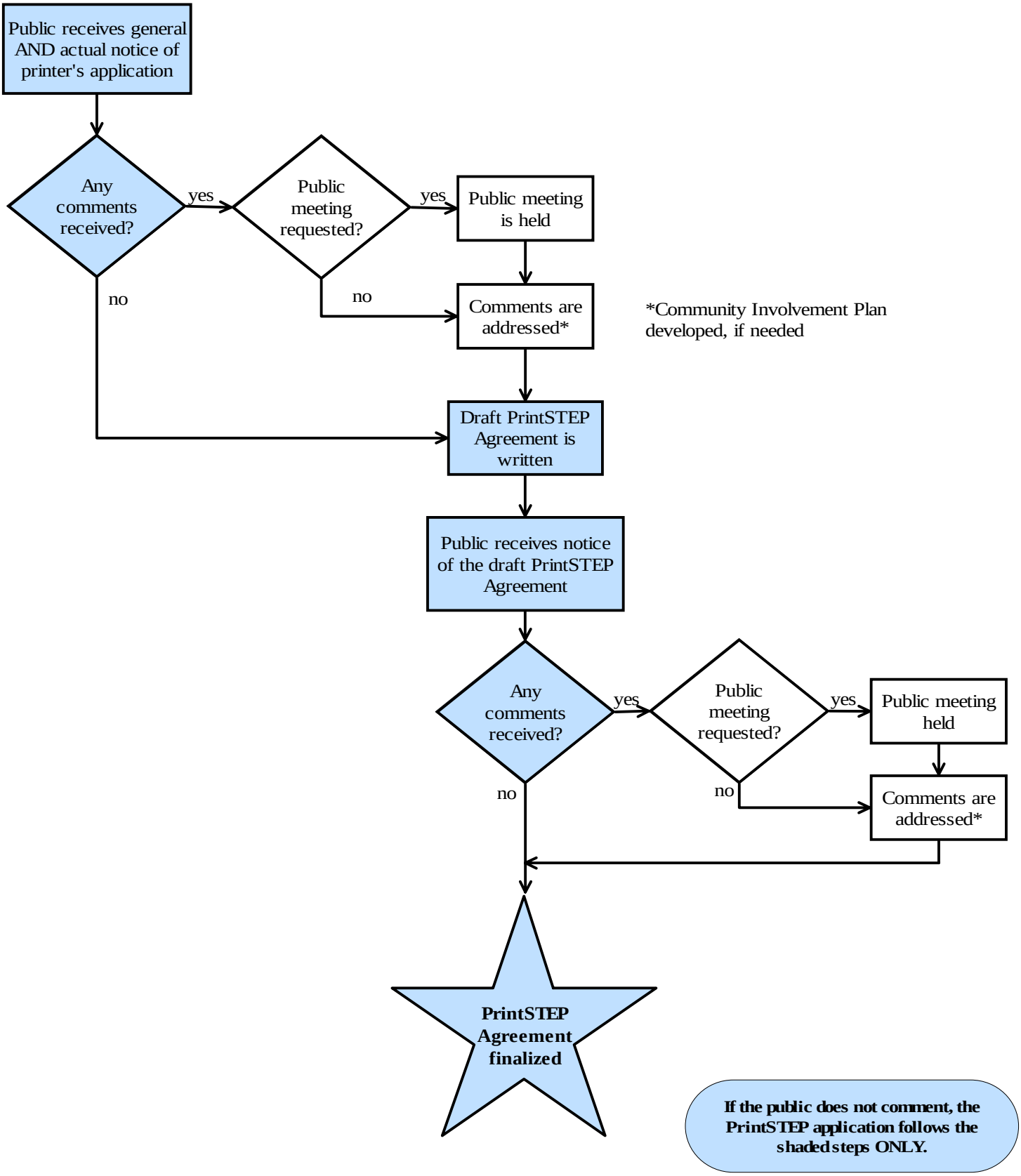
As in Limited Public Involvement, the state determines if a public meeting is needed to discuss the application. A Community Involvement Plan may also be developed.

Comments are Addressed

The state, community and printer will work together to address any issues or concerns brought up at the meeting and in the comments. Responses to all formal comments will be documented by the state and will be publicly available through the Information Repository.

Figure 3

Full Public Involvement Requirements



The Public Comments on the Draft Agreement

The public will be asked to comment again. This time, they will be commenting on the draft Agreement, not on the application. The public will be notified through General Notice, and registered parties and those who commented during the first round of comments will receive Actual Notice. The draft Agreement will be available in the Information Repository. The deadline for written comments and/or public meeting requests shall not be sooner than 30 days after the publication of notice.

A Second Public Meeting May Be Held

If, based on the comments, the state determines a public meeting is needed, the state will arrange the meeting. The notice shall be published once at least 30 days prior to the hearing in a newspaper of general circulation in the immediate area in which the site is or will be located.

Comments are Addressed

The state, community and printer will work together to address any issues or concerns brought up at the meeting. The state may make changes to the draft PrintSTEP Agreement. Responses to all formal comments will be documented by the state and will be publicly available through the Information Repository.

Keep in mind that PrintSTEP encourages a dialogue among all parties so that issues can be raised and addressed in a way that meets everyone's needs. Hopefully, the PrintSTEP Agreement will be agreeable to everyone. If not, anyone who submitted comments may appeal the Agreement. If any issues remain unresolved, the state will make the final decision on the printer's PrintSTEP Agreement.

Your PrintSTEP Agreement is Finalized

- ⇨ The NHDES agency will finalize your PrintSTEP Agreement.
- ⇨ The PrintSTEP Agreement will contain all your requirements for process waste water, hazardous waste, storm water, and air emissions. The Agreement replaces your current permits and approvals for these media.
- ⇨ When final, the state will send you your PrintSTEP Agreement. When you receive it, you're a PrintSTEP participant!
- ⇨ As a PrintSTEP printer, you must operate your facility following the requirements in your PrintSTEP Agreement. These are enforceable limits on your emissions.
- ⇨ The NHDES will file the PrintSTEP Agreement (except for Confidential Business Information) in the Information Repository.

Chapter 10:

What You Do Once You Are a PrintSTEP Participant

If You Have a PrintSTEP Notification

- Every year you must go through this Workbook to determine your facility's releases and wastes. You must keep the annual update for your internal records, but you don't need to send it into the state if you still qualify for PrintSTEP Notification (i.e., your emissions have not increased enough to where you would need a PrintSTEP Agreement). Over the next year, you must operate your facility within the limits for each of the media categories you listed on your PrintSTEP application and follow all regulatory requirements.

- If you anticipate your emissions/releases/wastes to increase so you no longer qualify for a PrintSTEP Notification, you must submit a new PrintSTEP application to the state PrintSTEP contact before exceeding any limits. You must follow all public involvement, regulatory, and PrintSTEP requirements associated with the increased environmental emissions/wastes.
- Once per year, NHDES will send you a copy of your PrintSTEP Application. You will need to update this with any changes, and resubmit to the NHDES. This report must detail any changes made at the facility over the previous year.

If You Have a PrintSTEP Agreement

- When you get your PrintSTEP Agreement, it will describe your regulatory requirements for process waste water, hazardous waste, storm water, and air emissions.

- Your PrintSTEP Agreement is enforceable and you are required to run your business in a way that is consistent with the requirements in the Agreement.

- Once a year, you will submit a PrintSTEP Annual report describing your facility's emissions and wastes to the state agency. This report must also detail all of the modifications made at the facility over the previous year.

- Once per year, NHDES will send you a copy of your PrintSTEP Application. You will need to update this with any changes, and resubmit to the NHDES. This report must detail any changes made at the facility over the previous year.

What if I Make Modifications

- One of the advantages of PrintSTEP is that it enables you to make modifications which could lead to an increase in emissions or wastes without necessarily requiring approval from the state. For example, modifications could include process changes, equipment changes, material additions or substitutions, or production increases or decreases. A description of the modifications must be included in your annual PrintSTEP application submitted to the NHDES. The following section applies to all PrintSTEP printers and describes what printers are required to do when making modifications.

Modifications that affect waste water, hazardous waste, or storm water, but do not change your regulatory category for these media

- If you make modifications in your operations (other than adding a new printing process or new pollution control equipment) that do not result in any change in your regulatory categories for waste water, hazardous waste, or storm water, there is no need to notify the state PrintSTEP contact. For example, if production increases result in an increase in hazardous waste generation, but you are still a "small quantity generator," you do not need to notify the state.
- For modifications within regulatory categories for these waste streams, you must follow the current regulatory procedures. Thus, PrintSTEP simply incorporates the existing modification requirements for these media.
- A description of the modification must be included in your annual report.

Modifications that affect air emissions, but do not change the facility's Air Levels (VOC, RTAP, HAP)

- Under the PrintSTEP pilot, if you make modifications that do not increase your emissions, in most cases **you do not need to notify the NHDES** to proceed.
  - If you are in VOC Level 1, 2, 3, or 4, you can make modifications that change your VOC emissions, provided that the modifications **do not increase** your PrintSTEP VOC Level to the next highest Level.
  - If your RTAP Level remains 1 (no permit required), no notification is required.
  - If you are in HAP Level 1 or 2, you can make modifications that change your HAP emissions, provided that the modifications do not increase you to HAP Level 3.
- When state notification or approval is not required at the time of the modification, if you are in Air Levels 2, 3, or 4, you must describe the change in the your annual report.
- If you are in Air Level 5, the state will include the process for making modifications in the printer's PrintSTEP Agreement. Your annual report must describe any modifications that resulted in an emission increase at the facility during the year.

Modifications that result in a higher regulatory category

- For any waste stream, if you intend to make modifications (including production increases) that could increase wastes or emissions, thereby putting the facility in a higher regulatory category, you must notify the state PrintSTEP contact.
- The printer must submit a new PrintSTEP application at the higher Level as soon as they anticipate the increase, *before* the increase occurs.
- Printers in Air Levels 1 and 2 are not required to track emissions data monthly; however, PrintSTEP air emission limits for *all* Air Levels are enforceable. Printers must look ahead to make sure they're not exceeding the Air Level's threshold. If printers go over the threshold for their Air Level, it's up to the state to decide on an enforcement action.
- If the modifications move the facility to a category that requires public involvement, then the public will be involved in the modification process. While the public will have access to the complete PrintSTEP Agreement, they can only comment on the part of the Agreement that is being changed.

Modifications that result in a lower regulatory category

- For any waste stream, if you make modifications (including production decreases) that decrease wastes or emissions, thereby putting the facility in a lower regulatory category, you can resubmit a PrintSTEP application and get your regulatory requirements reduced.
- Applications for a lower regulatory category must be based on a full year of data. After one year of data, you can submit a new application.

Adding a new printing process or a new type of pollution control equipment

- If a you plan to add a new type of pollution control equipment or a printing process that is new to the facility, you must fill out revised PrintSTEP application and submit it to the NHDES PrintSTEP contact only if one of the following apply:
  - Your VOC Level is 3, 4, or 5
  - Your RTAP level is above the de minimus levels (see Chapter 7)
  - Your HAP level is 2 or 3
- The revised PrintSTEP application should describe the new process or equipment.
- The NHDES will review the information and send you an updated PrintSTEP Notification or Agreement.
- The NHDES will add this information to Information Repository.

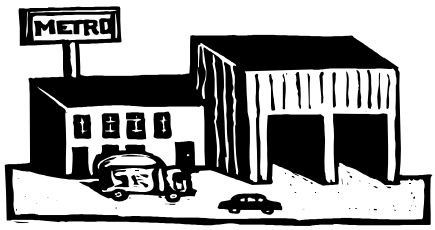
Technical Assistance

Technical Assistance is available, free of charge, for all PrintSTEP Program participants. Technical Assistance specialists can help you, one-on-one, in your facility. Take advantage of this valuable resource!

- They can work with you to identify opportunities for pollution prevention.
- They can help you with your PrintSTEP application.
- They offer compliance assistance.
- They can also guide you in the right direction to make these recommendations happen.
- See Appendix A for contact information.

CHAPTER 11

How to Build a Partnership with Your Community



Why Should You Get Involved with Your Community?

We all care about the environment in which we live, work, and play. We want to feel that we are safe from things like fire, crime, and pollution --- external hazards that affect whole communities. As a printer, you are, of course, an important part of the community in which you operate. As a community member, you must do your part to keep the environment clean and healthy. And some community members want to know what the businesses in their area are doing to protect the environment. Therefore, your role may include not only minimizing your facility's impact on the environment, but also keeping interested community members informed of these efforts. By informing people and letting them see what you do, you can build trust and credibility with your community.

How Can You Get to Know Your Community?

Whether or not you have public involvement requirements under PrintSTEP, it's worth the time to talk with groups and neighbors you haven't communicated with before, to get a feel for who might be interested in your facility's activities.

Keep in mind that all of your efforts are helping to build a partnership with your community that will benefit both you and them. When community members aren't informed of new developments, they may assume that the situation is worse than it is. The best way for you to avoid this is to communicate openly with them about your facility. Some ways to do this beyond formal public involvement requirements are:

- Invite community members in for a facility tour. By explaining your processes and showing them how you handle your wastes, you are building trust.
- Publicize any emissions reduction goals you may have, and report your progress. This lets people know that you are concerned about the environment and are actively trying to reduce your environmental impact.
- Communicate early and often with the public about your operations, particularly if you are planning new projects.

Keep the Conversation Going

Once you get acquainted with the different members of your community, it is important to engage in a continuing dialogue to foster your relationship. Besides the PrintSTEP requirements for public participation, here are some suggestions to keep the community informed.

- Hold meetings to gather public comments on your company's operations. These are not meant to tell you how to run your shop. Rather, they provide a forum for both you and community members to air concerns about the environment, clarify misunderstandings, and find workable solutions.
- Offer your employees opportunities to participate in the community as "ambassadors" of your printing business through company-sponsored service projects or other arrangements. By encouraging your workers to talk with others about your shop and to bring back peoples' concerns, you will set an example of trust and openness with your staff that will build credibility with your community.

Involving the Public Early: Everyone Benefits

Let's say that you work through Step 4 of PrintSTEP and find you have requirements for Full Public Involvement based on your releases. However, instead of waiting until the state sends out notice, you decide that you would like to hear about the community's concerns now, early in the process. So, you announce a facility Open House.

During the Open House, you meet some of your neighbors and other community members. You give them a tour and they ask a lot of questions about your processes. Some people ask questions about your use of solvents. They are concerned about the health risk from inhalation of vapors, both inside and outside the facility. You explain the things you've done to reduce emissions, as well as why you are using certain technologies. They are curious about how much a new press (that you plan to install later in the year) will increase emissions. At the end of the tour, the participants are enthusiastic about the steps you've taken so far to reduce emissions, but they ask to have another tour after your new press is installed.

The tour has helped the community understand your process. When it's time for public comment and involvement as part of PrintSTEP, your community will be more informed. You may have even answered all of their concerns, in which case a formal public meeting may not be needed, expediting the PrintSTEP process.

Who Gets Actual Notice or How is the Community Defined?

In PrintSTEP, the community will receive notice of each application for a PrintSTEP Agreement. One type of notice is "Actual Notice to the community," as described in Chapter 9. But who is included in "the community?" Every community is different, as is every printer. No hard-and-fast definition can describe all of the diverse communities throughout the U.S. To figure out who gets Actual Notice of the PrintSTEP Agreement and application, the relevant community has to be defined. This definition must strike a delicate balance between including everyone who may be affected or interested in the facility, and setting boundaries to avoid overwhelming people with notices. The PrintSTEP Stakeholder Advisory Group, with community, industry, and government representatives, established guidelines for who receives Actual Notice. The Advisory Group considered the following aspects in defining the community:

- All abutters are part of the community.
- The Advisory Group will consider using a radial **distance** appropriate to the population density of the area. For example, while a mile radius may be appropriate

for a moderately populated areas, it may be unrealistic in a very densely populated area.

- Sensitive populations nearby will be considered, such as a nursing home, school, playground, or day care center. Each of these groups might have different sets of concerns.

- Disproportionately affected populations might be especially concerned about facilities in the area. In the past, poor and minority communities have often suffered more than other communities from exposure to environmental pollution.

- Natural boundaries will be taken into consideration, such as a watershed area, that extends beyond man-made borders.

- The Advisory Group will also consider involving existing groups. If local groups (e.g., local businesses and their employees, groups concerned with the environment, environmental justice advocates, health advocacy groups, religious institutions) serve as forums for interested community members to voice their concerns, this might help to define the community.

Environmental Risk and Risk Management

The factors that will be considered in determining who gets Actual Notice are similar to the factors considered when evaluating environmental risk. Simply put, environmental risk is the chance that some hazard to health or the environment will occur. One approach to evaluating risk is called risk assessment. While risk assessment is not a part of PrintSTEP, it is described here to give you a fuller understanding of how some environmental decisions are made.

Risk assessment is an evaluation of the potential for a problem to occur and the scientific analysis of its threat to human health and the environment. The evaluation may include information on how harmful the chemical is and whether it is more dangerous if a person drinks it, breaths it, or gets it on their skin (hazard); information on the likelihood of people or the environment coming into contact with the chemical (exposure); and the length and frequency of contact.

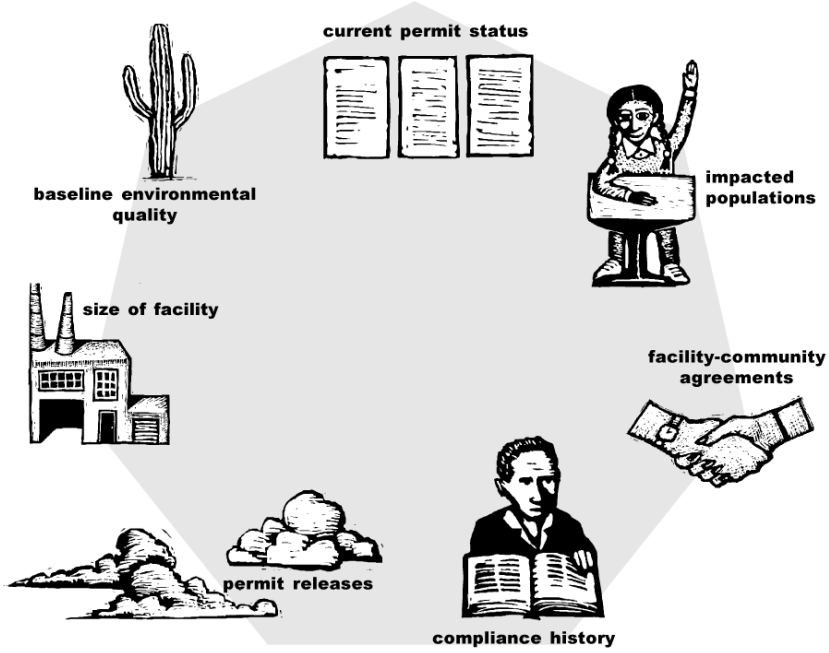
Although risk assessments are based on science, they are rarely precise because absolute data almost never exist. Additionally, most assessments consider just one chemical, one environmental medium (air, water, or land), and one risk at a time, so the results are not always reflective of real life" circumstances. It is also important to note that conducting a formal risk assessment can be a time-consuming and expensive process.

Risk management is the process of identifying, evaluating, selecting, and taking actions to reduce risks to human health and to ecosystems. This process tries to account for social, cultural, ethical, political, and legal considerations.

In deciding how best to manage risks at a particular facility, a number of factors may be evaluated (See Figure 4). The importance of each of these factors will depend on the circumstances. These factors may include:

- **Size of the Facility** What is the total number of employees? How many employees perform activities of specific concern?
- **Impacted Population** What is the population density? Are residents or sensitive populations nearby?
- **Permit Releases** Is the facility seeking a new permit or a modification of an existing permit?
- **Regulatory Thresholds** What regulatory thresholds apply to air, water, and hazardous waste?
- **Compliance History** Has the facility complied with state and local regulations, emergency planning and community right to know requirements, OSHA requirements, etc.?
- **Baseline Environmental Quality** What is the existing quality of air, water, land; proximity to sensitive eco-systems; proximity to other industries; and potential cumulative impact from all emission sources?
- **Agreements Between Facilities and Communities** Does the facility have an on-going relationship with the community?

Figure 4: Factors to Consider in Evaluating Risk



CHAPTER 12
Occupational Safety & Health and Environmental Protection Programs

Introduction

Although PrintSTEP does not include OSHA regulations, worker health and safety programs required by the Occupational Safety and Health Administration (OSHA) should also be considered. It is beyond the scope of this document to delineate exact requirements for each OSHA regulatory program. Instead, brief summaries of the major standards and information on current OSHA resource materials and contacts are provided in Appendix A. Note that these are summaries only and should not be used for purposes of determining compliance.

According to the National Safety Council, work-related injuries and deaths cost industry about $120 billion per year. According to the U.S. Bureau of Labor Statistics (BLS), about 5% of injury and illness cases in all U.S. industries are caused by exposure to harmful substances or environments. Therefore, it is important to lower chemical exposures where feasible. It is also important to review chemicals used in printing operations to ensure that products are acceptable for employee health and safety and the environment.

It is important that workers take advantage of the information on chemicals in their workplace that is provided by material safety data sheets (MSDS). An explanation of the types of information on the MSDS is provided in the following section, followed by an MSDS form. EPA and OSHA both are striving to make sure that this data is accurate, useful and available to workers. For some facilities, MSDSs must also be submitted to the Local Emergency Planning Commission (LEPC), which uses them for emergency planning activities. The information on the MSDS is key to protecting workers, the community and emergency response personnel.

Why Do Environmental and Health & Safety Issues Go Hand-in Hand?

- There are many examples of linkages between environmental and worker health & safety practices. Examples include:
- Appropriate handling practices and procedures for used supplies have a significant impact on worker and environmental protection.

- In an effort to reduce solvent emissions, many printers are investigating chemical substitution with materials that are less volatile (likely to evaporate). However, such an investigation should also consider the toxicity and potential for human health effects of potential replacement products or processes.
- Material data safety sheets are important for worker and environmental protection. An efficient system of receiving, reviewing, cataloging, retrieving, and updating these sheets is a cornerstone to a printing business' chemical hazard communication and control and environmental management programs.
- Hazard Communication, Hazardous Materials Handling, Personal Protective Equipment, and Respiratory Protection programs are some examples of where there is a crossover between environmental and occupational safety and health.

  EPA and OSHA are both concerned with protecting human health and the environment. The distinction between them is that OSHA focuses on protecting workers whereas EPA focuses on protection of the community at large. However, many of the control methods and programs are closely related. Both programs recognize that people spend a significant amount of time at the workplace.

  - Whenever chemicals contact the outside environment they also usually affect the workplace environment, frequently at higher levels of concentration, with greater potential for impacting human health.
  - Some OSHA and EPA requirements are redundant, such as gathering chemical information, spill response, and training.
  - Integrating worker and environmental protection can lead to more efficient and better programs.

What if I Need Further Information?

If you don't understand the terms or recognize how they apply to the information here to your operation, you should seek training or assistance from the following:

- Federal OSHA Compliance Assistance Program
- State OSHA Compliance Assistance Program
- State Health Department, Bureau of Occupational Health
- Industry trade associations
- Industry labor unions, health & safety departments
- Occupational health clinics
- University or College-based occupational safety & health programs (usually in schools of Public Health or Engineering)
- Coalitions on Occupational Safety & Health (COSH groups)

Occupational Safety and Health Program
NH Dept. of Health and Human Services
6 Hazen Drive, P.O. Box 95,
Concord, NH 03302-0095

Health and Safety consultation for small businesses. Features on-site OSHA assistance, regulatory research, and workshops.
CONTACT: Stephen Beyer at (603) 271-4646 or e-mail sbeyer@dhhs.state.nh.us.

OSHA publishes several publications that briefly describe their standards in plain language. Single copies are usually available for free by calling their publications office at (202) 219-4667.

OSHA maintains an extensive website at www.osha.gov. In addition to the full text of all OSHA standards, you can also find news releases, the OSHA office directory, answers to frequently asked questions, OSHA directives, interpretation letters and other publications.

Material Safety Data Sheets

Material Safety Data Sheets (MSDSs) are required for each chemical product found in the workplace including cleaning solvents. They detail a product's properties, and must be kept on file and made available to employees. The information on these sheets includes identification of the hazardous chemicals within a product, any potential physical or health hazards, precautions for safe handling, emergency first aid procedures, required personal protective equipment, and more .

While MSDSs also provide basic environmental information, they should not be viewed as the sole source of this information. Suppliers and distributors are another good source of knowledge concerning the environmental impacts of chemical products in your facility. An MSDS form is provided on the following pages. Sample MSDSs can be found at www.siri.org.

Section I lists general information including the manufacturer's name, address, telephone number, and the chemical trade name of the product. The chemical family name and/or formula may be provided. Also, and most important, this section has the 24-hour Emergency Phone Number to be contacted for additional information about the product in the event of an emergency. This phone number can also be used to obtain environmental information about the chemical product.

Section II provides information on health hazards. Here you can find information on how the chemical may enter the human body, such as by inhalation or skin contact, referred to as routes of exposure, and whether or not it is considered a carcinogen. This section does not provide information on environmental hazards. However, suppliers often present environmental regulatory information in Section II (e.g., a chemical in the product is subject to Section 313 of SARA Title III).

Section III, Physical Hazards, lists reactivity data. It tells whether the material is stable in normal use, lists other incompatible materials, hazardous decomposition products (that may occur when a material is burned), and whether the material is subject to hazardous polymerization (whether it can react with itself in hazardous ways).

Section IV provides emergency first aid procedures.

Section V lists physical characteristics of the material. This includes boiling point, vapor pressure, vapor density (if vapor density is less than 1, vapors will rise; if greater than 1, vapors will sink and collect in low areas), solubility in water, specific gravity (if less than 1 the material will float on water; if greater than 1, it will not float), percent volatile by volume, evaporation rate, and appearance and odor. From the information on volatile organic compounds (VOCs), a facility can calculate emissions from equipment or the facility. This helps the facility determine the level of environmental regulations that apply to them.

Section VI lists any fire or explosion hazards. It includes the flash point (the temperature to which vapors of the material must be heated before a spark or flame will ignite them), the upper and lower flammable limits (the concentration of the material that will burn in air), and what to use to put out the fire. The flash point is one of the factors that is used to determine if a waste is hazardous.

Section VII lists special protection information. Included is suggested respiratory protection and advice on when gloves and/or eye protectors should be worn, and suggestions for ventilation requirements to be used with the material. This section also details the procedures to be taken in case of a spill or other accidental release. Often, this section features the phrase, "dispose of in compliance with federal, state, or local regulations."

Additional sections describing hazardous ingredients of the product or regulatory information may be included. Information may be provided on the permissible exposure limits, or PEL, (also commonly referred to as Threshold Limit Values, or TLVs) of the chemical. The PEL is a limit, set by OSHA, at which an employee can be exposed to a chemical day after day with no adverse effects. Information on other regulations, such as SARA Title III or Department of Transportation restrictions, may be described.

MATERIAL SAFETY DATA SHEET

PRODUCT CODE: **Sheetfed Ink** MSDS DATE: **March 28, 1997**

HMIS HAZARD RATING: Health = 0 Flammability = 0 Reactivity = 0

SECTION I General Information

Manufactured by: **ABC Ink Incorporated** Tel (212) 555-1212
100 Main Street Fax (212) 555-5555
New York, NY 12345

ABC Ink Inc. Product Identification:
Chemical Name: Ink #100

SECTION II	**Health Hazards**
Acute:	None
Eye Contact:	None
Skin Contact:	None
Ingestion:	May be harmful if swallowed.
Inhalation:	Minor respiratory tract irritation if dust generated
Carcinogenicity:	Not listed as carcinogen or possible carcinogen by NTP, IARC, or OSHA

SECTION III **Physical Hazards**

Stability: Stable Unstable

Materials to Avoid (Incompatibility): Strong acids, strong alkali

Hazardous Decomposition Products: Oxides of carbon; various hydrocarbons, see Fire Data.

Hazardous Polymerization: May Occur Will Not Occur

Conditions to Avoid: Do not heat containers about 250 degrees F.

SECTION IV	**Emergency and First Aid Information**
Eye Contact:	N/A
Skin Contact:	N/A
Ingestion:	Provide emetic. Consult physician.
Inhalation:	Remove from area. Consult physician if irritation occurs.

MATERIAL SAFETY DATA SHEET - ABC Ink Inc. (continued)
PRODUCT CODE: Ink #100

SECTION V Physical Data

Boiling Point: >200 deg. C Melting Point: <10 deg. C Specific Gravity: 1.05 +/- 0.04

Vapor Pressure: N/A Vapor Density: N/A Solubility in Water: Negligible

Reactivity in Water: Negligible Appearance and Odor: Faint oil odor, colored paste.

SECTION VI Fire and Explosion Data

Flash Point: >100 deg. C Flammable Limits: LEL = N/A UEL = N/A

Autoignition Temperature: >300 deg. C Extinguisher Media: CO2, Foam, Dry Chemical

Special Fire Fighting Procedures: Wear self-contained breathing apparatus and full protective clothing

Unusual Fire and Explosion Hazards: Possible generation of various hydrocarbons ranging from simple (e.g., methane, ethane) to toxic/irritating gases such as carbon monoxide, acrolein, ketones, and aldehydes.

SECTION VII Protective Equipment/Control Measures

Personnel -

Respiratory Protection: N/A

Eye Protection: Safety glasses

Skin Protection: Not needed under normal usage. If heated, wear goggles, apron and gloves.

Other Protective Measures: None required beyond standard safety practices as applied to any industrial chemical

Handling and Storage -

Precautions/Recommendations: Store below 150 deg. F. Wear safety glasses.

Spill Procedures: Sweep up or scoop up into containers.

Waste Disposal: Dispose of in accordance with all applicable regulations; non-hazardous under RCRA.

SECTION VIII Regulatory Information

HMIS Rating: Health = 0 Flammability = 0 Reactivity = 0

*** Codes - Insignificant Risk = 0; Slight = 1; Moderate = 2; High = 3; Extreme Risk = 4

SARA Title III, Section 313: This product contains no chemicals listed in 40 CFR 372.

DOT Hazard Class: Non-hazardous/Not regulated

Clearance by U.S. Office of Management and Budget (OMB)

An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

The OMB Control # for this application form is 2020-0023. The expiration date is October 31, 2004.

The reporting burden is estimated to average 3 hours per printer per year, including time for completing the full application and providing updated information at the end of the first year of the pilot.

You are welcome to submit comments on the Agency's need for this information. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822), 1200 Pennsylvania Avenue, NW, Washington, D.C. 20460; and to the Office of Information and Regulatory Affairs, Office of Management and Budget, 725 17th Street, NW, Washington, D.C. 20503, Attention: Desk Officer for EPA. Include the EPA ICR number (1941.02) and OMB control number 2020-0023) in any correspondence.

Appendix A:
Technical Assistance Contacts

NH Department of Environmental Services
6 Hazen Drive, Concord, NH 03301
www.des.state.nh.us
Includes the following assistance providers:

Small Business Technical Assistance Program
sbtap@des.state.nh.us
Clean Air Act compliance and technical assistance.
Small Business Ombudsman, regulatory research, site.
Current focus: printers
Contact: Rudy Cartier 800-837-0656 or 603-271-1379.

NH Pollution Prevention Program
www.des.state.nh.us/nhppp
Provides confidential compliance and pollution prevention assistance to NH businesses.
contact: Sara Johnson 800-273-9469 or 6503-271-6460

NH Industrial Pre-Treatment Program
gcarlson@des.state.nh.us.
Offers waste water and water pollution assistance program for businesses.
Features regulatory and pollution prevention assistance, and site visits.
Contact: George Carlson 603-271-2052

Printing Industries of New England
www.pine.org
5 Crystal Pond Road, Southborough, MA 01772-1758
PINE is a 113 yr old non-profit trade association serving more than
500 printing and graphic communications companies in New England.
CONTACT: Mark Flannery 800-365-7463 or 508-804-4107 mflannery@pine.org

NH Small Business Development Center
www.nhsbdc.org
1000 Elm Street, 12th Floor, Manchester, NH 03101
Offers free and confidential business counseling and environmental assessments.
Enhance profitability and promote a cleaner environment.
CONTACT: Andrea O'Brien, Environmental Counselor at 603-634-2622 aob@cisunix.unh.edu.

WasteCap Resource Conservation Network (ReCoN)
www.wastecapnh.org
122 Main Street, Concord, NH 03301
ReCoN is an initiative of the Business and Industry Association of New Hampshire.
Provides confidential assistance in reducing solid waste, conserving energy and water, and preventing pollution.
CONTACT: Barbara Bernstein at 603-224-1517 for more information,
or e-mail wastecapnh@aol.com.

New England Environmental Assistance Team (NEETeam)
http://www.epa.gov/region01/steward/neeat/print1.html
US EPA - New England, 1 Congress Street, Suite 1100, Boston, MA 022114
Provides regulatory compliance and pollution prevention assistance.
Features financing investment guide, compliance manuals, education and outreach.
CONTACT: (800) 906-3328 for more information.

Screenprinting & Graphic Imaging Association International
www.sgia.org
SGIA International, the trade association for the screen printing and graphic imaging industry, provides technical assistance on a wide array of topics including safety and health, environmental, and personnel issues. SGIA also answers technical process questions.
10015 Main Street, Fairfax, VA 22031
CONTACT: Marcia Kinter 703-385-1335 or email marcik@sgia.org

Flexographic Technical Association
http://www.flexography.org/welcome.cfm
FTA is the trade association for the flexographic printing industry.
900 Marconi Avenue, Ronkonkoma, NY 11779-7212
CONTACT: Doreen M. Monteleone, Ph.D. P:(631) 737-6020
or email dmonteleone@flexography.org

Graphic Arts Technical Foundation
a non-profit education and research foundation
200 Deer Run Road, Sewickly, PA 15143
CONTACT: Gary Jones
p: (412) 741-6860, fax: (412) 741-2311, e-mail: GaryJGATF@aol.com

Printers' National Environmental Assistance Center (PNEAC)
a computer-based assistance center
www.pneac.org or contact:
Gary Miller
Illinois Waste Management and Research Center
phone: (217) 333-8940
Wayne Pferdehirt
University of Wisconsin Solid & Hazardous Waste Education Center
phone: (608) 265-2361

Flexible Packaging Association
a trade association
971 Corporate Boulevard
Linthican, Maryland 21090
Mark Wygonik
phone: (410) 694-0800
fax: (410) 694-0900

Gravure Association of America
1200A Scottsville Rd.
Rochester, NY 14624
Greg Tyszka
phone: (716) 436-2150
fax: (716) 436-7689

National Association of Printing and Ink Manufacturers (NAPIM)
a trade association
581 Main Stree
Woodbridge, NJ 07095-1104
George Fuchs
phone: (732) 855-1525
fax: (732) 855-1838

National Pollution Prevention Roundtable
organization of state and local pollution prevention programs
2000 P Street N.W.
Washington, DC 20036
phone: (202) 466-P2P2
fax: (202) 466-7964
website: www.p2.org

Newspaper Association of America
a trade association
1921 Gallows Road, Suite 600
Vienna, VA 22182
phone: (703) 902-1833
fax: (703) 902-1857

Packaging and Label Gravure Association (PLGA)
P.O. Box 6185
Venice, FL 34292
Reg Farrant
phone: (941) 473 0807
fax: (941) 473 0834
website: www.plga.com

Pollution Prevention Information Clearinghouse
an EPA-operated library and hotline
U.S. Environmental Protection Agency
401 M Street SW
Washington, DC 20460
phone: (202) 260-1023
fax: (202) 260-0178
e-mail: ppic@epamail.epa.gov

Tag and Label Manufacturers Institute
1700 1st Ave S.
Iowa City, IA 52240-6041
phone: (319) 337-8247

OSHA assistance:
Occupational Safety and Health Program
NH Dept. of Health and Human Services
6 Hazen Drive, Concord, NH 03301
Health and safety consultation for small businesses.
Features on-site OSHA assistance, regulatory research, and workshops.
CONTACT: Stephen Beyer at (603) 271-4646 or e-mail sbeyer@dhhs.state.nh.us**.**

Appendix B:
Pollution Prevention Case Studies

Appendix B is designed to help you get started doing P2 at your facility right away, and includes:

A mini-P2 guide for your facility: page B-1
Getting started doing P2 at your facility is easier than you think. Here is a step-by-step guide to get you going.

Environmental Cost Accounting: page B-6
Techniques you can use to identify real costs and align your environmental goals (like getting into compliance with state environmental regulations) directly to financial improvement.

Case Studies: page B-9
Examples of printers using P2 to their advantage

A Mini-P2 Guide for Printers

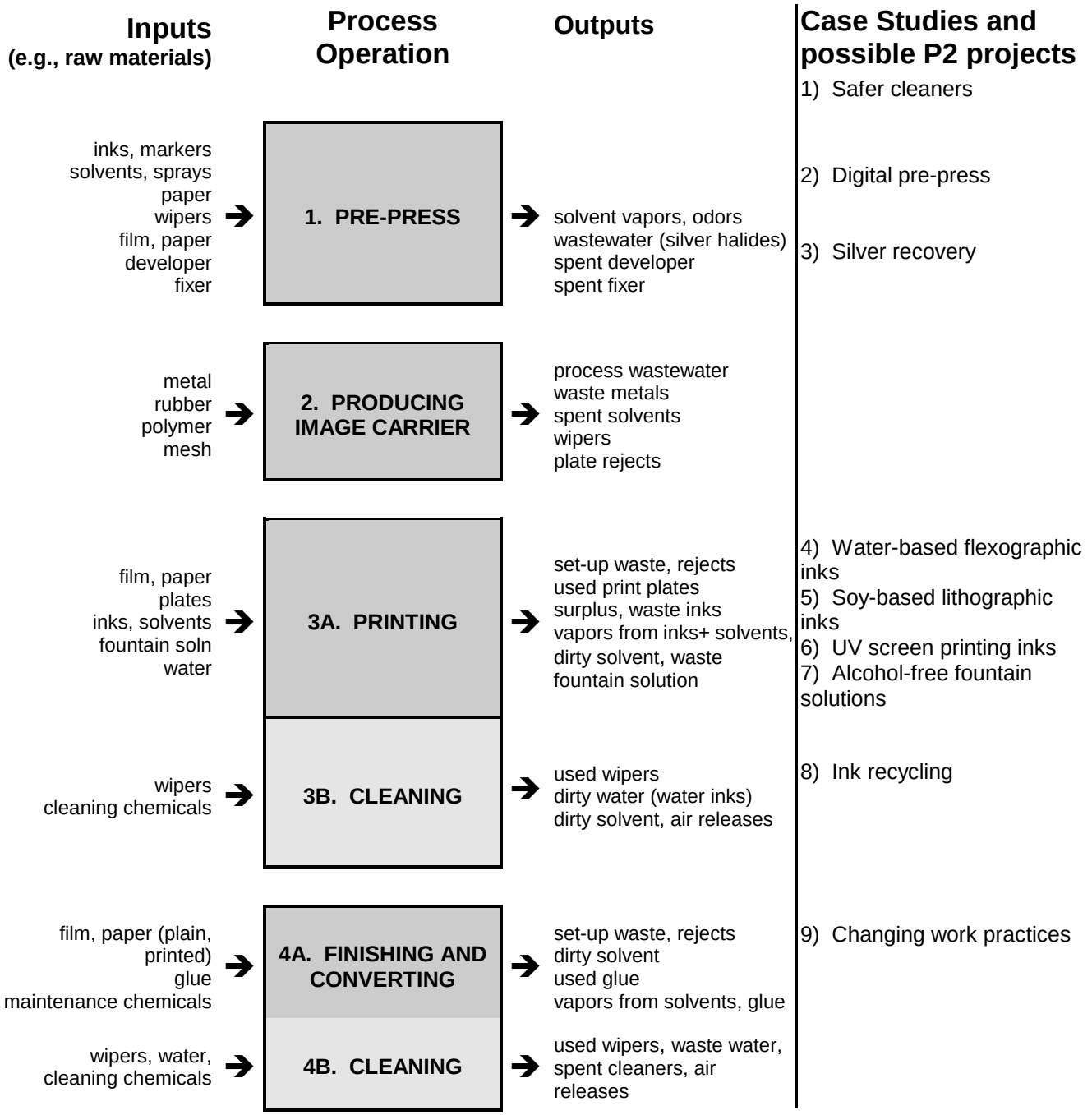
- **Getting Started**
- **Determining Costs**
- **Identifying P2 Opportunities**
- **Prioritizing your P2 Options**
- **Using Vendor and Customer relationships**

Getting Started!

To figure out where else you can reduce waste in your facility, or which changes will generate the most significant savings, start by making a "process map" or process flow diagram." The sample Process Map on page B**-2** will get you started. The map should show all the raw materials and energy you use in your process (inputs) and all products, wastes, and emissions your process creates (outputs). By writing this down, you can more easily identify which processes are generating the most waste, and then identify areas for possible P2 projects. The sample Process Map may not represent *everything* that should be on your flow chart, but you can use it as a starting point.

To create your process map, list each step in your process. For each step, write down what materials are going into the process step, the energy and water necessary for the process, and what's coming

Process Map



out. Include everything you can think of. For example, in addition to ink and paper, include other materials like shop towels, water, and electricity for inputs. For outputs, remember to include wastes such as evaporative losses and unusable raw materials, in addition to your waste ink and solvent. Remember to include steps in your diagram that are not directly part of the production process- steps like routine cleaning and maintenance.

Once your map is created, it is a good idea to tour the facility to complete and verify your process map. Talk to the lien workers, maintenance personnel and supervisors . Ask questions about why certain chemicals or processes are used, how the process could be improved, and what are the consequences of using a particular chemical or process.

Once your map is complete, you can use it to determine where your resources are going, identify P2 opportunities in your processes, and prioritize those opportunities (see below).

Determine Costs

Once you have developed a process map, you need to determine the costs associated with all the listed inputs and outputs. Wasted or "lost" raw materials can be expensive. When looking at waste generation costs, remember to includes more than just treatment and disposal costs- remember to include "hidden" costs. Hidden costs are costs associated with waste handling that are often overlooked because they are usually written off as overhead. For example, you may spend a lot of time and money complying with regulations for the waste you generate. These environmental expenses are often assigned to overhead costs, not to the processes responsible for them- thus "hidden" costs. Estimating costs is OK since many of these numbers are difficult to obtain. Activities typically hidden in overhead costs include:

- Reporting
- Record keeping
- Permits & fees
- Safety training
- Protective equipment
- Monitoring
- Labeling & storage
- Inspections
- Manifesting
- Insurance

Add these costs to your process map. Environmental cost accounting is the term used to look at how environmental costs are identified and allocated to each process of a firm's operations. When you use environmental cost accounting, your company will be able to bring environmental goals and financial goals together. More information on environmental cost accounting is presented on page B-6.

Identify Pollution Prevention Opportunities

Once your process map is complete, and associate costs have been assigned to each process, you can begin to identify areas for possible pollution prevention projects. Analyze the map to identify where your most expensive raw materials are going. Which wastes are most expensive to dispose? What causes your biggest regulatory burdens? What causes your biggest environmental headaches? Where are your biggest hidden costs? Where would you really like to make some changes? Answers to these questions can direct you towards areas that are ripe for P2 projects. Involve staff from all levels of the organization, from the shop floor to upper management, to include all perspectives. You do NOT have to be a P2 expert to begin doing P2 at your facility; there is lots of help available. There are a number of organizations, documents and websites that can help you identify possible P2 options (see P2 Assistance Providers in Appendix A).

Prioritize your P2 Options

Once you have a list of possible P2 opportunities, you need to prioritize them based on criteria that are important to your company. Three criteria often used are effectiveness, implementability and cost. It is a good idea to start with a few simple projects that are inexpensive to implement ("low-hanging fruit), then build on those successes. This whole process is a lot more fun and rewarding than it sounds- and it can save you big bucks!

How Can Supplier and Customer Relationships Help?

There are lots of new products on the market to help printers reduce their emissions, go beyond compliance, and make their products more environmentally friendly. Work with your vendors/suppliers to find alternative products that work for you.

Let your suppliers and distributors know that you're interested in finding out about products that can reduce your impact on worker and environmental health. Your role as a customer is powerful. Suppliers are often familiar with the latest pollution prevention technology, but have not offered them because you haven't indicated that this is important.. In turn, your customers may tell you that

they would like you to be environmentally conscious. In addition, the market is changing constantly and alternative products are always being introduced, so keep asking every 6 months or so.

You can also advertise your environmental accomplishments to help bring in more business, or apply for a NH Governor's Award for Pollution Prevention (www.des.state.nh.us/nhppp).

Where Can I go for Help?

There are lots of resources available to help your company become more environmentally friendly and save you money. Information and technical assistance resources for printers are listed in Appendix A.

Environmental Cost Accounting

Efficient production is dependent on accurate and consistent measurement of inputs and outputs. As is often said, "what gets measured gets managed." Without good cost information, it's difficult to set accurate prices for your products and services, assess your profitability, or (harder still) know what to change to make your business more profitable. Environmental cost accounting is how environmental costs are identified and allocated to each process of a firm's operations. When you use environmental accounting concepts, your company will be able to bring environmental goals and financial goals together. This shows how environmental improvement can lead directly to financial improvement.

When evaluating environmental investments, firms typically look at only the direct costs of equipment, raw material, labor, and waste disposal. Less obvious "hidden" costs associated with waste include permitting, reporting, insurance and liability are often over-looked. Conversely, hidden benefits from improved working environment and public image, should also be considered. By not including these less obvious financial impacts, a company may underestimate the benefits of a pollution prevention project and may reject a good investment.

In addition, some environmental compliance costs are incurred only when use of a material or generation of a waste exceeds a certain threshold; if you reduce your material use and waste generation below this threshold, or use a different chemical, you can save money on permitting and managing the waste.

Environmental Cost Accounting

A lithographer set out to determine if the capital investment in a computerized pre-press system was justified. The printer has 15-employees and annual revenues of $1 million. The firm currently sends any jobs it receives on diskette to a service bureau to produce film for platemaking. The company did a quick financial analysis to calculate the initial capital cost of installing a computer pre-press system and annual savings possible. Then they performed both a traditional cost analysis and an in-depth cost analysis that included environmental cost accounting (ECA). The ECA analysis revealed significant additional costs and savings. The differences in the results of the two types of analyses are shown in the table on the following page.

Traditional Cost Analysis	Environmental Cost Accounting Analysis
Savings	
reduced use of the service bureau	All savings listed for Traditional Cost Analysis, plus:
reduced courier charges	10% increase in revenue (due to faster turnaround, and gave them better process control)
	reduced labor for pre-press darkroom
	reduced labor for stripping operations
	reduced supervision cost
	reduced use of darkroom chemicals
	reduced use of external typesetting services
Costs	
Equipment costs	All costs listed for Traditional Cost Analysis, plus:
Installation costs	labor time to solicit and consider bids
	contractor work associated with accommodating the new equipment
	initial training costs
	new computer pre-press labor
	increased film costs
Results	
5-year net present value of $58,358	5-year net present value of $187,700
5-year internal rate of return of 51%	5-year internal rate of return as 132%
Payback period of 2.14 years	**Payback period of 0.82 years**

Source: Tellus Institute, . Snapshots of Environmental Cost Accounting"

What Environmental Cost Accounting Tools Are Available?

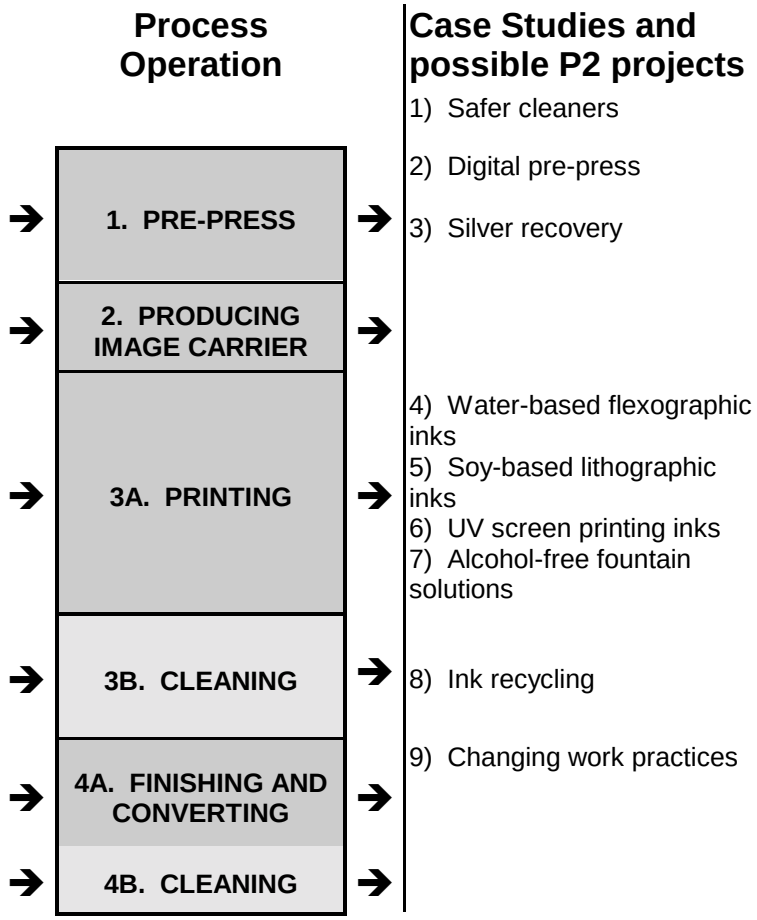
There are several good, free references available to help you analyze the true costs of waste and potential savings from P2 projects:

- ***Green and Profitable Printing*** is a video accompanied by a notebook. This was produced by the University of Wisconsin Extension, Solid & Hazardous Waste Education Center, in collaboration with the Graphic Arts Technical Foundation. They can be reached at (608) 262-7376 or fax (608) 265-3459.
- ***Snapshots of Environmental Cost Accounting*** includes case studies of printers and others who have applied these concepts written by Tellus Institute. You can contact Tellus Institute at (617) 266-5400, fax (617) 266-8303 or www.tellus.org.
- ***P2 Finance*** software packages have been designed for lithography, screen printing, and flexography. The software provides worksheets and instructions to walk you through the steps of conducting an environmental cost accounting assessment at your facility. Contact Tellus Institute at the number above.
- Check out EPA's Environmental Accounting Project's website at: www.epa.gov/opptintr/acctg.

Case Studies

There are lots of case studies available on the Internet or elsewhere. Presented below are a few that can be tracked on the flow chart on page B-2 (summarized below).

Case Study #	Type of Printing	Topic	Page
1	All	Safer cleaners	B-10
2	Screen	Digital pre-press	B-11
3	All	Silver recovery	B-12
4	Flexo	Water based inks	B-13
5	Litho	Soy based inks	B-14
6	Screen	UV curable inks	B-14
7	Litho	Alcohol free fountain soln.	B-15
8	All	Ink recycling	B-15
9	All	Changing work practices	B-16



Case Study 1: Safer Cleaners

Today, more and more cleaning formulations for printing presses and plates are safer than traditional solvents, which contained chemicals such as toluene and methyl ethyl ketone (MEK). The safer alternatives have been developed for both solvent- and water-based formulations, and can be applied both on and off press.

Printing facilities are using these alternative formulations with more than satisfactory cleaning results and without generating hazardous waste. One facility found that the cleaner was effective at penetrating the relief images of plates and required less brushing than most other cleaners on the market. At another facility, the safer cleaner provided better results with less hassle than the previously used product.

In the new solvent-based cleaning formulations, toluene and other hazardous petroleum distillates are replaced with aliphatic hydrocarbons and proprietary components. Many of the new water-based cleaners are low-foaming liquids that work when the water-based inks and coatings are still wet. However, most water-based cleaners are still not effective enough to clean water-based inks that are dried (e.g., plugged anilox rollers in flexography).

Source: Shapiro, Fred, "Cleaning and Quality: Partners in Reducing Pollution," FLEXO

Case Study 2: Digital Pre-Press

Print Design is a screenprinting facility. Because Print Design does not have a high-resolution output device, it uses service bureaus to generate camera ready art and proofs. Currently Print Design uses gelatin silver photographic film to generate positives from camera-ready art. However, since Print Design uses an on-site septic system, it is prohibited from disposing process water from its darkroom down the drain. Silver must first be recovered from the wash water, then wash water and fixer are collected separately for off-site disposal.

Increasing waste disposal costs and costly service bureau charges prompted Print Design to examine production changes that would decrease its reliance on waste haulers and service bureaus. One option, a dry film imaging system, would allow Print Design to generate positives directly from the computer, thus bypassing the darkroom. Not only would this option reduce service bureau charges, but it would reduce darkroom and waste disposal costs. However, this system had a limitation: the maximum width of dry film is currently 42 inches, but Print Design produces jobs up to 48 inches in width.

Print Design estimated costs to determine the feasibility of implementing a dry film imaging system. First, Print Design collected costs for its current pre-press process. Silver film, chemical costs and service bureau costs were available from the company□s general ledger. Labor costs associated with process camera operation were estimated. Investment costs for the new dry film imaging equipment were collected from the system vendor. A staff training budget was estimated. Because the dry film system could only handle jobs up to 42 inches wide, Print Design would continue to use the darkroom and service bureau for its widest jobs. However, the process camera operator would only be required half-time, and annual service bureau costs would be significantly reduced.

Print Design decided to implement the dry film system. This allowed them to get their jobs to press faster by avoiding the minimum 24 hour turnaround time required when using service bureaus. Therefore, the new system is expected to net Print Design additional earnings, because Print Design is now able to accept jobs it had to turn down in the past because of the turnaround time the service bureau needed would have taken too long to meet customer's deadlines.

Source: Tellus Institute, Boston, MA

Case Study 3: Silver Recovery

One Vermont printer significantly reduced the volume of wastewater it generated by implementing closed-loop recycling and evaporation. Part of this reduction was due to the elimination of film processor wash water. The company installed four small ion exchange units that were hard-piped to individual film processors. The ion exchange units remove silver from the wash water. The rinse water is then filtered to remove resin particles and is reused in the film processors.

The company also uses an electrolytic silver recovery unit to remove silver from spent fixer. An electrical current is applied to two electrodes immersed in the solution; silver is collected on one of the electrodes, removed periodically, and sold. An ion exchange system is also used to remove silver after the electrolytic silver recovery step. The de-silvered fixer is stored on-site until it can be evaporated. These steps reduced the volume of hazardous wastewater streams along with the costs associated with managing and disposing of the hazardous streams.

Source: Vermont Agency of Natural Resources, Pollution Prevention Division, Pollution Prevention Successes: A Compendium of Case Studies from the Northeast States, NEWMOA

Case Study 4: Ink Alternatives: Water-Based Flexographic Inks

A wide web flexographic printing facility in Illinois successfully reduced volatile organic compounds (VOCs) and hazardous waste by switching from solvent-based to water-based ink. The company manufactures decorative packaging products for the floral industry, producing approximately 125 to 150 million linear feet of product each year from flexographic presses.

The company found that its solvent-based inks (50 percent VOCs by weight) were the primary source of its VOC emissions. The company decided to replace its solvent-based ink system with a water-based system. There were many technical challenges with switching to water-based inks, including drying problems and variable print quality. However, the facility was dedicated to using the new system and conducted many hours of research to find solutions. For example, the company improved its drying systems by lowering temperatures and increasing air flow rates, and improved print quality by monitoring the pH and viscosity of the inks.

As a result of switching inks, the company reduced its VOC emissions 99 percent in seven years. The only VOC emitted is dipropylene glycol methyl ether, which is not a hazardous air pollutant (HAP). In addition, the facility completely eliminated hazardous waste from waste ink and cleaning operations. A small amount of non-hazardous solid waste is generated from disposable cleaning wipes. The reduction in VOC emissions and hazardous waste occurred even as the company's production more than doubled during the seven-year time frame.

Source: Design for the Environment Flexography Case Study 1: Reducing VOCs in Flexography, EPA 744-F-96-013

> *EPA's Design for the Environment Program: Through the DfE program, EPA develops and provides businesses with information to make environmentally informed choices and design for the environment. DfE forms voluntary partnerships with industry, public interest groups, universities, research institutions, and other government agencies to develop environmentally friendly alternatives to existing products and processes. Within each project, the DfE program ensures that the information reaches the people who make the choices - from managers to industrial design engineers to materials specifiers and buyers.*

Case Study 5: Ink Alternatives -- Soy-Based Lithographic Inks

A printing facility in Illinois was one of the first sheetfed offset printers in the U.S. to use soy-based inks. The main potential environmental benefit claimed for soy-based inks is that they emit fewer VOCs than traditional petroleum-based inks. Sheetfed soy-based inks are defined as those that have a minimum of 20 percent soy oil by volume.

This facility found that it uses 17 percent less soy-based ink than petroleum-based ink. This difference is offset by the slightly higher cost of soy-based inks. However, there are other less tangible benefits to using soy-based inks, including improved company image, improved employee morale, and customer preference for the product. Other factors, such as makeready time, product appearance, and cleanup effort, remain essentially the same. The facility's customers found the print quality acceptable, and many prefer to have their jobs printed with the soy-based inks.

Source: Simpson, Beth, et. al., Project Summary: Waste Reduction Evaluation of Soy-Based Ink at a Sheet-Fed Offset Printer, Risk Reduction Engineering Laboratory, EPA 600-SR-94-144

Case Study 6: Ink Alternatives: Ultraviolet-Curable (UV) Screen Printing Inks

A screen printer doing about one million dollars of business installed a UV curing process, which eliminated 40 percent of their solvents and solvent-based inks. Currently, the company uses the UV process for 80 percent of its work. All regulatory limits on chemicals and metals in their wastewater have been met.

In the past, using solvent inks, the presses had to be cleaned every 100 to 150 sheets to ensure ink would not dry on the screens. This was time consuming and affected the consistency of the jobs. The new UV process has reduced the need to stop work to inspect and clean the press.

Although this printer is reinvesting in new materials to make the operation more amenable to this process, they are noticing both an increase in profits due to new jobs with firms that like the high-gloss finish, and savings in production and labor costs. Since the UV unit was installed, business has increased by 20 percent and is growing.

Source: Massachusetts Office of Technical Assistance

Case Study 7: Alcohol-Free Fountain Solutions

A folding carton manufacturer and printer in Massachusetts was using large amounts of isopropyl alcohol (IPA) in the fountain solution for its offset printing presses. The company was generating up to six 55-gallon drums of waste solution per month from four sheetfed offset presses. To address the economic, health, and environmental concerns of using IPA, the company installed a new alcohol-free fountain solution delivery system. Reverse osmosis equipment was also installed to filter water and adjust pH and conductivity, because IPA substitutes are less tolerant to variations in water quality.

By switching to an alcohol-free fountain solution, the company has nearly eliminated VOC emissions and also realized cost savings. The new fountain solution delivery system cost $108,000, but the cost savings in material costs alone provided a payback period of less than two and a half years. In addition, there are substantial cost savings from increased production efficiency, reduced disposal costs, and reduced permitting costs.

Source: Toxics Use Reduction Case Study: Alcohol-Free Fountain Solutions at Americraft Carton, Inc., Office of Technical Assistance (OTA)

Case Study 8: Ink Recycling

A newspaper company wanted to recycle its ink but couldn't afford an on-site recycling system. The company decided to use a third-party, mobile ink recycling service which didn't require extensive capital investment. The company collects its waste ink, keeping process colors and black in separate drums. The recycling service treats and recycles the waste ink, producing ink that is ready for reuse. Only paper residue from the original waste stream needs to be disposed of. The company saves approximately $20,000 per year in disposal costs and $10,000 per year in labor costs by not having to manage the hazardous waste stream.

Source: Newspaper Association of America, Pollution Prevention Manual

Case Study 9: Effectively Changing Work Practices

Let's face it- few people like change. One printer in Minnesota discovered that addressing employee concerns in advance of making process changes helped ensure success of their P2 project. When considering a change of cleaning solvents to more environmentally-friendly products, the company needed to find a technical solution that met production requirements and develop new cleaning procedures that would work with lower vapor pressure cleaning solvents. However, each press crew used different methods to clean press printing blankets. The company needed to get the crews to buy into changing their very personal cleaning methods to the new method.

The company prepared three documents to help the transition. The first document contained background information and highlighted potential and real costs of not changing, as well as the benefits to the environment and working conditions. The second document provided a clear, step-by-step description of the new cleaning procedure. The company described exactly what the press operator would experience in using the new procedure and product, specifically what it would look like, what it would smell like, and what it would feel like. Providing these important details gave the company tremendous credibility with all of the crews, because there were no surprises. The third document presented frequently asked questions that were raised in earlier interviews with different crews.

As a result of the thorough preparation, the change in work practices and cleaning solvent was completely successful. Today, all cleaning solvents are recovered and recycled back to the facility for reuse. The company eliminated costly hazardous waste disposal, improved indoor air quality, maintained production performance standards, and gained customer and community good will. In addition, employees recognized that they had a very big role in the success story.

Source: Jeff Adrian, The John Roberts Company

Appendix C:
Additional Hazardous Waste Information

Appendix C includes:

- ◇ Example Hazardous Waste Manifest
- ◇ NHDES Fact Sheet:
  Waste Mercury-Containing Lamps: Management Requirements for Handlers and Transporters
- ◇ Listed Hazardous Wastes Most Likely Used by Printers
- ◇ Sample Posting for Emergency Information

NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES
WASTE MANAGEMENT DIVISION
Health and Human Services Building
6 Hazen Drive, Concord, NH 03301-6509
603-271-2921

FOR STATE USE ONLY

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. | Manifest Document No.

2. Page 1 of

Information in the shaded areas is not required by Federal law, but may be required by State Law.

3. Generator's Name and Mailing Address

A. State Manifest Document Number: NH H 0033998

B. State Generator's ID (Location)

4. Generator's Phone ( )

5. Transporter 1 Company Name | 6. US EPA ID Number

C. State Transporter's ID

D. Transporter's Phone

7. Transporter 2 Company Name | 8. US EPA ID Number

E. State Transporter's ID

F. Transporter's Phone

9. Designated Facility Name and Site Address | 10. US EPA ID Number

G. State Facility's ID (Not Required)

H. Facility's Phone

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.					EPA / STATE
b.					EPA / STATE
c.					EPA / STATE
d.					EPA / STATE

J. Additional Description for Materials Listed Above

a. c.

b. d.

K. Handling Codes for Wastes Listed Above

	Interim	Final		Interim	Final
a.			c.		
b.			d.		

15. Special Handling Instructions and Additional Information

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name | Signature | Month Day Year

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name | Signature | Month Day Year

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name | Signature | Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name | Signature | Month Day Year

EPA Form 8700-22 (Rev. 9-88) Previous Editions are Obsolete

GENERATOR — TRANSPORTER — FACILITY

TO REPORT A SPILL, CONTACT: NATIONAL EMERGENCY RESPONSE CENTER (1-800-424-8802), THE N.H. DEPT. OF SAFETY (1-800-346-4009) AND THE NH WASTE MANAGEMENT DIVISION (271-2942). TO REPORT AN OIL SPILL: NHWSPCD (271-3440).

COPY 1: DESTINATION STATE-MAILED BY FACILITY

NH H 0033998

Waste Mercury-Containing Lamps: Management Requirements for Handlers and Transporters

INTRODUCTION

Fluorescent and high intensity discharge (HID) lamps contain a small quantity of mercury that may pose a hazard to human health or the environment when improperly managed. Due to this concern, the New Hampshire Department of Environmental Services (DES) has developed a policy on waste mercury-containing lamps which promotes recycling, pollution prevention and safe handling methods. The policy is explained in this fact sheet.

Why is mercury an environmental concern? Mercury is a heavy metal that can accumulate in living tissue and cause adverse health effects. A small amount of mercury is an essential component in fluorescent and HID lamps, but when a lamp is broken or disposed of in a solid waste landfill or incinerator, the mercury can contaminate air, soil, surface water and groundwater. In New Hampshire, mercury has been detected in freshwater fish and a statewide fish consumption advisory has been issued by the NH Department of Health and Human Services. For more information on mercury in NH's environment, see DES's *New Hampshire Mercury Reduction Strategy*, published October 1998.

Are there other contaminants in lamps we should be concerned about? HID lamps also contain small quantities of lead. Incandescent lamps may contain lead and cadmium.

Is fluorescent lighting still a good environmental and economic choice? Yes. The use of energy-efficient lighting reduces electricity needed from power plants, which then reduces harmful emissions of mercury, carbon dioxide and nitrogen oxide. Also, when less energy is demanded, electric utilities need less generating capacity, resulting in more savings for customers.

DES POLICY FOR THE HANDLING OF MERCURY-CONTAINING LAMPS

Waste mercury-containing lamps generated by businesses, industry and institutions may **not** be disposed of as a solid waste unless they are below the regulatory limits for mercury when subjected to a toxicity test required by the U.S. Environmental Protection Agency (EPA) and DES. If test results from the Toxicity Characteristic Procedure (TCLP) demonstrate a particular lamp is below the regulatory level of .2 mg/liter, it may legally be disposed as solid waste. However, because these lamps still contain mercury, it is strongly recommended they be recycled since they can contribute mercury to the environment.
Generators of waste are responsible for determining whether their wastes are hazardous and, if so, managing them in accordance with the requirements of the *NH Hazardous Waste Rules*.

These requirements may include use of a hazardous waste manifest, NH registered hazardous waste transporter, and delivery to an authorized hazardous waste facility.

Alternatively, waste mercury-containing lamps may be handled under DES's universal waste policy, adopted October 14, 1998 (also adopted into Federal Universal Waste Rule; 40 CFR 273), which is further described in this fact sheet. DES believes that recycling is the preferred option for managing waste mercury-containing lamps and that this policy will promote the recycling and proper management of waste mercury-containing lamps.

Universal Waste
"Universal wastes" are wastes which meet the definition of hazardous waste in the *NH Hazardous Waste Rules*, but which, during accumulation and transport, pose a relatively low risk compared to other hazardous wastes. Wastes which DES has determined meet universal waste criteria include used antifreeze, mercury-containing lamps and devices, certain types of batteries, and recalled or suspended hazardous waste pesticides regulated under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). EPA recently added mercury-containing lamps to the Federal Universal Waste Rule which also includes thermostats, batteries**,** and recalled or suspended pesticides.

Generator Status
Under this policy, hazardous waste generators are not required to include waste mercury-containing lamps and other universal wastes in their calculation of generator status in accordance with the *NH Hazardous Waste Rules*, Env-Wm 503. Universal wastes, when recycled, are also not subject to the generator fee required by Env-Wm 512.02.

Universal Waste Consolidation
A facility may collect waste mercury-containing lamps from other sites or generators without a permit, provided the facility meets the handler requirements described in this fact sheet and complies with other applicable federal, state, and local regulatory requirements.

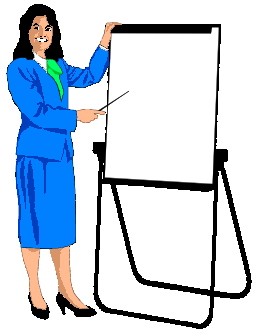
REQUIREMENTS FOR HANDLERS

A **"handler"** of waste mercury-containing lamps means: (1) a generator of universal waste mercury-containing lamps; or (2) an owner or operator of a facility that receives universal waste mercury-containing lamps from other handlers, accumulates the lamps, and sends the lamps to another handler or to a destination facility. Handlers of universal waste mercury-containing lamps must either meet the following standards or comply with the generator and/or facility requirements of the *NH Hazardous Waste Rules.*

1. **Release Prevention**
Manage waste mercury-containing lamps in a way that prevents releases of mercury to the environment. See the section titled: *"Best Management Practices for Mercury-Containing Lamps"* later in this fact sheet.

2. **Quantity Limits**

Accumulate no more than a combined total of 20,000 kilograms (approximately 44,000 pounds) of waste mercury-containing lamps and other universal wastes on-site at any time. Approximately 70,400 forty-eight inch fluorescent tubes would weigh 44,000 pounds.



Universal waste handlers are either large or small quantity handlers:

a. Small Quantity Handlers - may accumulate no more than a combined total of 5,000 kilograms (approximately 11,000 pounds) of waste mercury-containing lamps and other universal wastes on-site at any time. Approximately 17,600 forty-eight inch fluorescent tubes would weigh 11,000 pounds.

b. Large Quantity Handlers - may accumulate more than 5,000 kilograms of combined universal waste by complying with the additional requirements for large quantity handlers found in this fact sheet in the section titled, *Additional Requirements for Large Quantity Handlers*.

3. **Labeling**

Clearly label or mark each lamp or container of waste lamps with any one of the following phrases: "Universal Waste--Mercury- Containing Lamp(s)", or "Waste Mercury-Containing Lamp(s)," or "Used Mercury-Containing Lamp(s)".

4. **Accumulation Time Limits**

a. Accumulate waste mercury-containing lamps for no longer than one year from the date the waste mercury-containing lamps are generated or received from another handler.

b. Demonstrate the length of time that the waste mercury-containing lamps have been accumulated starting from the date the lamps became waste or were received. The handler may make this demonstration by:

(1) marking or labeling containers with the starting accumulation date; or
(2) maintaining an inventory system on-site that identifies the earliest date lamps were added to a container or received from off-site.

5. **Training**

Ensure that all employees who handle or have responsibility for managing waste mercury-containing lamps are thoroughly familiar appropriante handling and emergency procedures.

6. **Off-Site Shipments**

a. Handlers are prohibited from sending or taking waste mercury-containing lamps to a place other than another handler, a mercury-containing lamp recycling facility, or an authorized hazardous waste facility.

b. Prior to sending a shipment of waste mercury-containing lamps to another handler or destination facility, the originating handler must ensure that the receiving handler agrees to receive the shipment.

c. Shipments must meet all applicable United States Department of Transportation (US DOT) and New Hampshire Department of Safety (NH DOS) regulations for mercury-containing lamps.

d. If a waste mercury-containing lamp shipment is rejected by an intermediate handler or destination facility, arrangements must be made by the originating handler to:

(1) receive the waste lamps back when notified that the shipment has been rejected, or
(2) send the waste lamp shipment to an alternate facility.

7. **Exports**

A handler of waste mercury-containing lamps who sends the lamps to a foreign destination must comply with the requirements for international shipments as set forth in Env-Wm 510.06 of the *NH Hazardous Waste Rules*.

ADDITIONAL REQUIREMENTS FOR LARGE QUANTITY HANDLERS

A handler may collect more than 5,000 kilograms of combined universal wastes if he/she complies with all handler requirements in this fact sheet and with the following additional requirements.

1. Prior to collecting more than 5,000 kilograms of combined universal wastes, notify the NH DES of this activity and obtain an EPA Identification Number if you do not already have one.

2. Keep records for 3 years on each shipment of waste received or sent. These records must include:

a. the date of each shipment;
b. the quantities of each shipment; and
c. the name and address of the handler or facility from which waste lamps were received or shipped to.

REQUIREMENTS FOR TRANSPORTERS

1. Transporters are not required to obtain a NH hazardous waste transporter registration or use a hazardous waste manifest for mercury-containing lamps, but must meet all applicable US DOT and NH DOS regulations.

2. Transporters are prohibited from sending or taking waste mercury-containing lamps to a place other than:

a. another handler;
b. a mercury-containing lamp recycling facility; or
c. an authorized hazardous waste facility.

3. **Staging During Transportation**

a. Transporters who remove waste mercury-containing lamps from their vehicles and stage them temporarily are not required to obtain a hazardous waste transfer facility permit, but are subject to US DOT and NH DOS regulations.

b. Transporters who stage waste mercury-containing lamps for more than 10 days must also meet universal waste handler requirements.

c. Transporters must not stage more than a combined total of 20,000 kilograms (approximately 44,000 pounds) of waste mercury-containing lamps and other universal wastes on-site at any time.

4. **Exports**

Transporters taking waste mercury-containing lamps to a foreign destination must comply with the requirements for international shipments as set forth in Env-Wm 604.04 of the *NH Hazardous Waste Rules*.

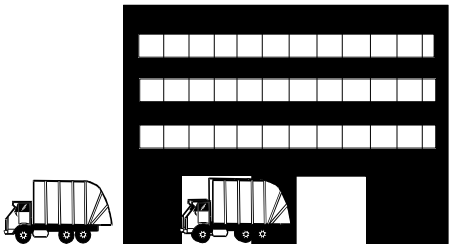
REQUIREMENTS FOR HANDLERS AND TRANSPORTERS

Prohibitions

Handlers and transporters are prohibited from dismantling, crushing, or treating mercury-containing lamps under this policy. If a handler or transporter uses a lamp crusher, s/he is subject to the full requirements of the *NH Hazardous Waste Rules*.

Handling Procedures for Broken or Damaged Lamps

1. Immediately contain and clean up all releases from broken, leaking or damaged mercury-containing lamps.



2. Place any broken or damaged lamps and any residues resulting from breakage or damage in a secure container.

3. The container must be closed and sealed, structurally sound and compatible with the broken lamps. A plastic lined box, fiber drum, or a plastic bucket with a lid that seals is recommended since some types of metal containers may be incompatible with mercury. Ensure the container is clean because if it is contaminated with other chemicals, those substances may react with the mercury.

4. Accidentally broken lamps may be sent to a recycling facility or a hazardous waste treatment, storage or disposal facility authorized to accept broken lamps. All applicable US DOT packaging and shipping requirements for broken mercury-containing lamps must be met.

FOR MORE INFORMATION

Questions on this policy should be directed to DES's Pollution Prevention & Education Section at 603-271-2956 or the Hazardous Waste Compliance Section at 603-271-2942.

A list of mercury containing lamp recycling facilities, DES's *New Hampshire Mercury Reduction Strategy*, copies of other fact sheets, and the NH *Hazardous Waste Rules* are available from DES's Public Information and Permitting Office at 603-271-2975, (TDD Access: Relay NH 1-800-735-2964). Copies of DES fact sheets and rules are also available on DES's web site at www.state.nh.us/des.

Information on US DOT regulations can be obtained from the NH Department of Safety, Hazmat Unit at 603-271-3349.

BEST MANAGEMENT PRACTICES FOR MERCURY-CONTAINING LAMPS

The following practices are recommended to prevent breakage:

(1) Store used intact lamps in one of the following containers:
a. the same boxes that new lamps were shipped in or other boxes of similar size; or
b. a fiber drum.

(2) Ensure containers are: sturdy; without holes, rips or tears; and stable (to prevent tipping over).

(3) Fluorescent tube lamps (e.g, T-8, T-12) should be stored upright. Metal halide, mercury vapor; and High Intensity Discharge (HID) lamps should be wrapped or packaged individually.

(4) Use box spacers between lamps to prevent breakage.

(5) Do not pack too many lamps into a container; the pressure could lead to breakage.

(6) Do not store too few lamps in a container unless there is enough packing material to prevent breakage.

(7) Do not tape lamps together. Many recycling facilities will not accept lamps which have been taped together.

(8) Label drums: "HANDLE WITH CARE / FRAGILE" (in addition to identifying the contents as required by DES's policy).

(9) Store boxes in a designated storage location away from high traffic areas.

(10) Do not over stack. Stack filled boxes no wider than five across with each row perpendicular to the ones below it. Stacks should be no higher than five feet so lamps on the bottom are not crushed by the weight.

(11) Avoid storing cardboard boxes and drums outside where they will be exposed to moisture. Use plastic containers if lamps must be stored outside.

(12) Do not store lamps in a metal drum because this can lead to breakage.

(13) Seal boxes with tape as soon as they are filled.

Cardboard boxes and fiber drums can be ordered from a lamp recycling facility, through a catalog, or purchased from carton distributors (see "Boxes" in the Yellow Pages).

<u>Disclaimer</u>: Information contained in this fact sheet is current as of August 5, 1999. Policy and regulatory changes occurring after this date may affect part or all of this information. For questions on the status of this information, contact DES at 603-271-2942.

LISTED HAZARDOUS WASTES MOST LIKELY USED BY PRINTERS

Env-Wm 402.06 Generic Industrial Process Wastes.

(a) EPA listed generic industrial process wastes shall be as listed in Table 4.5 below:

Table 4.5 EPA Generic Industrial Process Wastes

Industry and EPA Hazardous Waste Number	Hazardous Waste	Hazard Code
Generic:		
F001	The following spent halogenated solvents used in degreasing: Tetrachloroethylene, trichloroethylene, methylene chloride, 1,1,1-trichloroethane, carbon tetrachloride, and chlorinated fluorocarbons; all spent solvent mixtures/blends used in degreasing containing, before use, a total of 10 percent or more, by volume, of one or more of the above halogenated solvents or those solvents listed in F002, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.	(T)
F002	The following spent halogenated solvents: Tetrachloroethylene, methylene chloride, trichloroethylene, 1,1,1-trichloroethane, chlorobenzene, 1,1,2-trichloro-1,2,2-trifluoroethane, ortho-dichlorobenzene, trichlorofluoromethane, and 1,1,2- trichloroethane; all spent solvent mixtures/blends containing, before use, a total of 10 percent or more, by volume, of one or more of the above halogenated solvents or those listed in F001, F004, or F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.	(T)
F003	The following spent non-halogenated solvents: Xylene, acetone, ethyl acetate, ethyl benzene, ethyl ether, methyl isobutyl ketone, n-butyl alcohol, cyclohexanone, and methanol; all spent solvent mixtures/blends containing, before use, only the above spent non-halogenated solvents; all spent solvent mixtures/blends containing, before use, one or more of the above non-halogenated solvents, and, a total of 10 percent or more, by volume, of one or more of those solvents listed in F001, F002, F004, and F005; and stillbottoms from the recovery of these spent solvents and spent solvent mixtures.	(I)*
F004	The following spent non-halogenated solvents: Cresols and cresylic acid, and nitrobenzene; all spent solvent mixtures/blends containing, before use, a total of 10 percent or more, by volume, of one or more of the above non-halogenated solvents or those solvents listed in F001, F002, and F005; and still	(T)

Industry and EPA Hazardous Waste Number	Hazardous Waste	Hazard Code
	bottoms from the recovery of these spent solvents and spent solvent mixtures.	
F005	The following spent non-halogenated solvents: Toluene, methyl ethyl ketone, carbon disulfide, isobutanol, pyridine, benzene, 2-ethoxyethanol, and 2-nitropropane; all spent solvent mixtures/blends containing, before use, a total of 10 percent or more, by volume, of one or more of the above non-halogenated solvents or those solvents listed in F001, F002, or F004; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.	(I,T)
F006	Wastewater treatment sludges from electroplating operations except from the following processes: (1) Sulfuric acid anodizing of aluminum; (2) tin plating on carbon steel;(3) zinc plating (segregated basis) on carbon steel; (4) aluminum or zinc-aluminum plating on carbon steel; (5) cleaning/stripping associated with tin, zinc and aluminum plating on carbon steel; and (6) chemical etching and milling of aluminum.	(T)
F007	Spent cyanide plating bath solutions from electroplating operations.	(R,T)
F008	Plating bath residues from the bottom of plating baths from electroplating operations where cyanides are used in the process.	(R,T)
F009	Spent stripping and cleaning bath solutions from electroplating operations where cyanides are used in the process.	(R,T)
F010	Quenching bath residues from oil baths from metal heat treating operations where cyanides are used in the process.	(R,T)
F011	Spent cyanide solutions from salt bath pot cleaning from metal heat treating operations.	(R,T)
F012	Quenching waste water treatment sludges from metal heat treating operations where cyanides are used in the process.	(T)
F019	Wastewater treatment sludges from the chemical conversion coating of aluminum except from zirconium phosphating in aluminum can washing when such phosphating is an exclusive conversion coating process.	(T)
F020	Wastes, except wastewater and spent carbon from hydrogen chloride purification, from the production or manufacturing use, as a reactant, chemical intermediate, or component in a formulating process, of tri or tetrachlorophenol, or of intermediates used to produce their pesticide derivatives. Wastes from the production of Hexachlorophene from highly purified 2,4,5-trichlorophenol shall not be included with the wastes listed under the F020 hazardous waste number.	(H)
F021	Wastes, except wastewater and spent carbon from hydrogen chloride purification, from the production or manufacturing use as a reactant, chemical intermediate, or component in a formulating process, of	(H)

Industry and EPA Hazardous Waste Number	Hazardous Waste	Hazard Code
	pentachlorophenol, or of intermediates used to produce its derivatives.	
F022	Wastes, except wastewater and spent carbon from hydrogen chloride purification, from the production or manufacturing use as a reactant, chemical intermediate, or component in a formulating process, of tetra-, penta-, or hexachlorobenzenes under alkaline conditions.	(H)
F023	Wastes, except wastewater and spent carbon from hydrogen chloride purification, from the production of materials on equipment previously used for the production or manufacturing use as a reactant, chemical intermediate, or component in a formulating process, of tri and tetrachlorophenols. Wastes from equipment used only for the production or use of Hexachlorophene from highly purified 2,4,5-trichlorophenol shall not be included with the wastes listed under the F023 hazardous waste number.	(H)
F024	Process wastes, including but not limited to, distillation residues, heavy ends, tars, and reactor clean-out wastes, from the production of certain chlorinated aliphatic hydrocarbons by free radical catalyzed processes. These chlorinated aliphatic hydrocarbons are those having carbon chain lengths ranging from 1 to and including 5, with varying amounts and positions of chlorine substitution. This listing does not include wastewaters, wastewater treatment sludges, spent catalysts, and wastes listed in Env-Wm 402.06 and 402.07.	(T)
F025	Condensed light ends, spent filters and filter aids, and spent desiccant wastes from the production of certain chlorinated aliphatic hydrocarbons, by free radical catalyzed processes. These chlorinated aliphatic hydrocarbons are those having carbon chain lengths ranging from 1 to and including 5, with varying amounts and positions of chlorine substitution.	(T)
F026	Wastes, except wastewater and spent carbon from hydrogen chloride purification, from the production of materials on equipment previously used for the manufacturing use, as a reactant, chemical intermediate, or component in a formulating process, of tetra-, penta-, or hexachlorobenzene under alkaline conditions.	(H)
F027	Discarded unused formulations containing tri-, tetra-, or pentachlorophenol or discarded unused formulations containing compounds derived from these chlorophenols. Formulations containing Hexachlorophene synthesized from prepurified 2,4,5-trichlorophenol as the sole component shall not be included with the wastes listed under the F027 hazardous waste number.	(H)
F028	Residues resulting from the incineration or thermal treatment of soil contaminated with EPA Hazardous Waste Numbers F020, F021, F022, F023, F026, and F027.	(T)

(b) The hazard codes (I, T) shall be used to specify mixtures of F003 with F001, F002, F004, and F005 wastes which would then contain ignitable and toxic constituents.

(c) New Hampshire listed generic process wastes shall be as listed in Table 4.6 below:

Table 4.6 New Hampshire Generic Process Wastes

Industry and EPA Hazardous Waste Number	Hazardous Waste	Hazard Code
NH01	Used Oil	(T)
NH51 to NH74	Reserved	

Env-Wm 402.07 Specific Industrial Process Wastes.

(a) EPA listed specific industrial process wastes shall be as listed in Table 4.7 below:

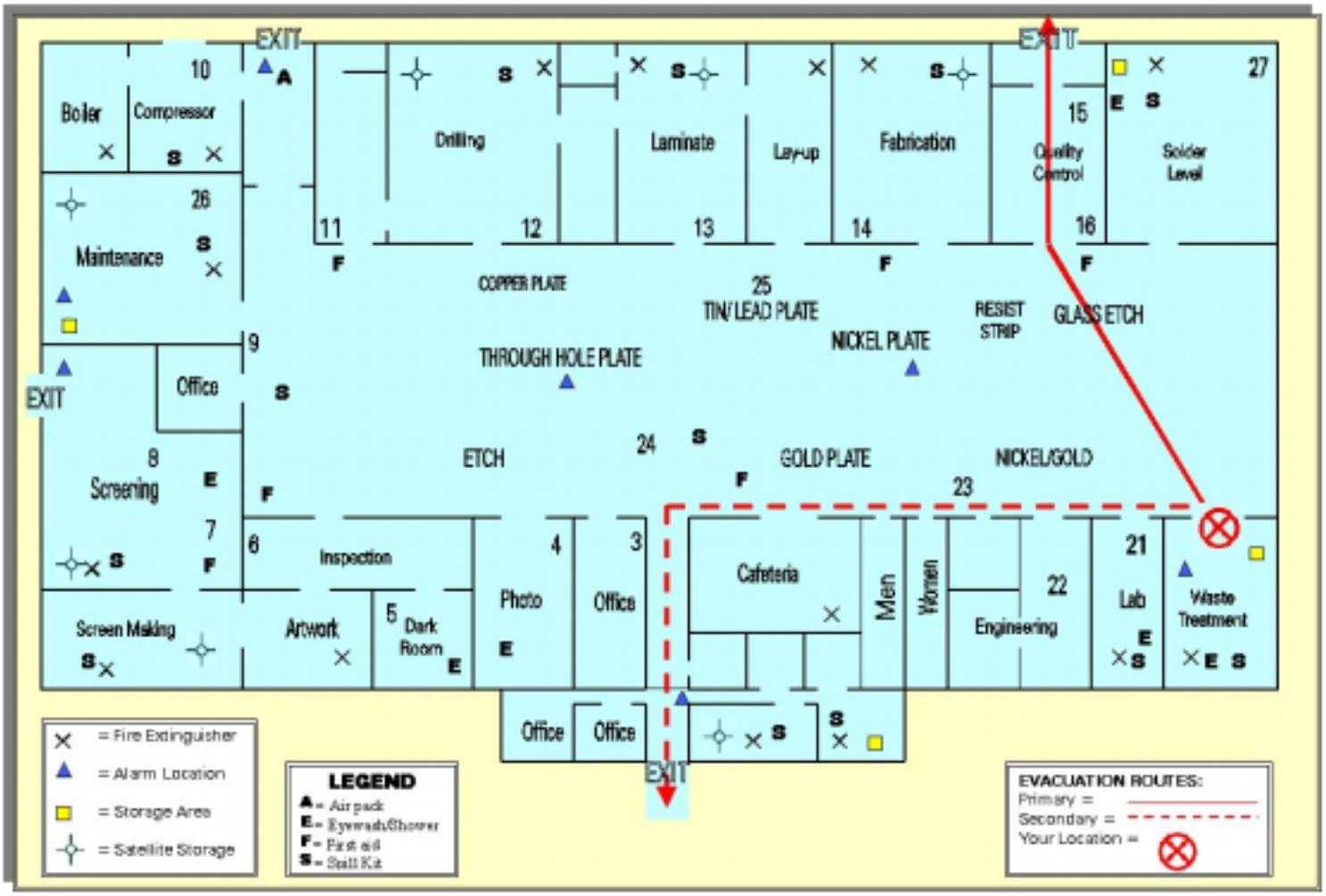
Sample Posting

EMERGENCY RESPONSE NOTIFICATION LIST

CONTACT	PHONE NUMBER
FIRE:	911
POLICE:	911
AMBULANCE:	(603) 555-1111
HOSPITAL:	(603) 555-2222
NH DES SPECIAL INVESTIGATIONS/ EMERGENCY RESPONSE:	(603) 271-3899 *(Mon-Fri, 8:00 am - 4:00 pm)*
NH STATE POLICE:	(800) 346-4009 *(All other times: Nights, Weekends, Holidays)*
NATIONAL RESPONSE CENTER:	(800) 424-8802
ABC TRANSPORTER:	(603) 555-3333

EMERGENCY COORDINATORS

CONTACT		PHONE NUMBER			
PRIMARY-	JOE GENERATOR:	Work:	EXT. 123	Home:	(603) 555-4444
ALTERNATE #1-	ANITA C. PROFIT:	Work:	EXT. 456	Home:	(603) 555-5555
ALTERNATE #2-	JOHN HAZLEAK:	Work:	EXT. 789	Home:	(603) 555-6666



Env-Wm 509.02(b) Each full quantity generator shall post a list of the steps to take if an emergency occurs and the following emergency numbers at the nearest telephone to each hazardous waste storage area:

(1) The emergency coordinators, home and office;

(2) The fire department, police department, hospital and state of New Hampshire and local emergency response teams that may be called upon to provide emergency services, unless the facility has a 24 hour response team designated to provide emergency services whose number is posted; and

(3) The location of fire extinguishers and spill control material and, if present, fire and internal emergency alarm.

Appendix D:
PrintSTEP Air Levels: Material Use Tables

Appendix D includes:

- ◇ An Example Materials Use Worksheet
- ◇ More information on the Materials Use Air Levels Tables

EXAMPLE Materials Use Worksheet

①	②	③
Printing Process	**VOC-containing materials**	**Qty VOC-containing materials** used in the last 12 mo.
Rotogravure with solvent-based inks	inks	AB white ink 10,000 lbs
		GJ's blue 30x 8,000 lbs
	dilution & cleaning solvent	AB solvent 1,000 lbs
	adhesives & coatings	Super adhesive 2,000

VOC Total **21,000 lbs**

Now use the Worksheet totals to determine the PrintSTEP VOC Level. Using the Materials Use Air Level Table below, find the Level associated with the total VOC-containing material used, as recorded in the "VOC Total" box. Write that Air Level in Box 1. **It's 21,000 lbs in the example.** Assume this example facility is a rotogravure printer using solvent-based inks, therefore use the second column in the table to find the Air Level.

Material Use Air Level Table for VOCs -

Sheetfed Offset or Nonheatset Web Lithography, or Screen Printing	**Heatset Web Offset Lithography (uncontrolled), or Flexography or Rotogravure with solvent-based inks**	**Flexography or Rotogravure with water-based inks***	**Air Level**
less than 1,425 gals	less than 10,000 lbs	less than 40,000 lbs	Level 1
1,425 - 3,560 gals	10,000 - 25,000 lbs	40,000 - 100,000 lbs	Level 2
3,560 - 7,125 gals	25,000 - 50,000 lbs	100,000 - 200,000 lbs	Level 3
7,125 - 14,250 gals	50,000 - 100,000 lbs	200,000 - 400,000 lbs	Level 4
more than 14,250 gals	more than 100,000 lbs	more than 400,000 lbs	Level 5

* A water-based ink contains no more than 25% of the volatile fraction as VOCs.

Check one:	Your VOC LEVEL is:
❑	VOC Level 1
✓	**VOC Level 2**
❑	VOC Level 3
❑	VOC Level 4
❑	VOC Level 5

More information on PrintSTEP Materials Use method for determining Air Levels

Why was the Materials Use method developed?
The Materials Use method was developed to help you quickly and easily determine your facility's PrintSTEP Air Level. To complete your PrintSTEP application, you must determine your Air Level, either using the Materials Use method in Chapter 6 **or** the Emissions Calculations method in Appendix E. Both methods help you estimate emissions, but the Materials Use method provides a handy shortcut for many printers.

The Materials Use method allows you to determine your facility's PrintSTEP Air Level based on your facility's material usage for the last 12 months. By assuming that a facility's air emissions are the result of the materials used by that facility, the Materials Use method translates material used into air emissions. This method provide a conservatively high estimate of your air emissions.

Who can use the Materials Use method?
The Materials Use method only works for those printers who use ONE type of printing process at their facility. The types of printing processes defined by PrintSTEP are:

- Sheetfed or Nonheatset Web Offset Lithography
- Heatset Web Offset Lithography
- Screen Printing
- Flexography or Rotogravure Printing Using Water-based or Solvent-based Inks

NOTE!! Printers who use MORE THAN ONE type of printing process at their facility must use the Emissions Calculations method in Appendix E to estimate emissions. In addition, printers who want credit for the reductions resulting from their pollution control devices must use the Emissions Calculations method.

NOTE!! Printers must use the Emissions Calculations method instead of the Materials Use method if 10% or more of their facility's total Volatile Organic Compound (VOC) or Hazardous Air Pollutant (HAP) emissions come from products not listed on the Materials Use Worksheet in Chapter 6.

How does the Materials Use method provide a conservatively high estimate of emissions?

- The Materials Use method was developed using the most conservative assumptions to provide a safety margin. For example, the method assumes that 100% of press cleaners evaporate. In reality, often much less than 100% of the wash actually evaporates.
- Conservative assumptions are used so you can be sure the Materials Use method will not *underestimate* your emissions, provided you do not increase production (e.g., increased hours of operation). If anything, it will *overestimate* your air emissions.
- If you use the Materials Use method and find you are a Level 1 facility (the lowest level), you can be certain you are in the right level. Even with overestimated emissions, you're in the level with the fewest regulatory requirements.
- The Materials Use method is a quick tool to estimate air emissions, but it does not account for factors such as low-VOC cleaners, or pollution control equipment.
- If you use the Materials Use method and find you are in Level 2 or higher, you may want to use the Emissions Calculations method instead because the Materials Use method might be overestimating your emissions.
- Many printing facilities are small sources of air emissions that will be in Level 1 using the Materials Use method. This is why the Materials Use method can be really helpful; it gives the majority of printers a quick way to estimate their air emissions.

The Emissions Calculations method in Appendix E

The Emissions Calculations method allows you to account for factors that reduce your air emissions and are not accounted for in the conservative assumptions used in the Materials Use method. If you are using pollution control equipment or low-VOC cleaners or inks, you may find you are in a lower level using the Emissions Calculations method. See the example below.

Using Emissions Calculations Method to Account for Low VOC Inks

A flexographic printer uses 500,000 pounds of water-based inks per year. Using the Materials Use method, this printer is in VOC Level 5. The Materials Use method makes the conservative estimate that water-based inks have a VOC content of 25%. In reality, this printer's inks only have a 5% VOC content. Because of this difference in actual and assumed VOC content, the Materials Use method overestimates this printer's emissions. Using the Emissions Calculations method, however, the printer can get full credit for their low VOC ink. The Emissions Calculations method shows that the printer is in VOC Level 4 for air emissions, and with the lower level come fewer regulatory requirements.

What assumptions were made in developing the Materials Use method?

1. The gallons of HAP-containing materials used (2,667 gallons [20,000 pounds] or 6,667 gallons [50,000 pounds]) are based upon 2-butoxyethanol as the representative HAP, which weighs 7.5 lbs/gallon, all evaporated.
2. "Cleaning solvent" density is assumed to be 7.0 lbs/gallon, 100% VOC, and all evaporated.

3. "Fountain solution additives" include isopropyl alcohol, n-propyl alcohol, n-butanol, and alcohol substitutes. The weight of isopropyl alcohol is 6.6 lbs/gallon, but for the table is assumed to be 7.0 lbs/gallon and 100% VOC.
4. The water-based inks, water-based coatings and water-based adhesives are assumed to contain no more than 25% of the volatile fraction as VOC and all is assumed to evaporate. (Control Techniques Guidelines for Graphic Arts--Rotogravure and Flexography. EPA-450/2-78-033).
5. "Adhesives" and "Coatings" for solvent-based operations are assumed to weigh 7.0 lbs/gallon, 100% VOC, and all evaporated.

Appendix E:
PrintSTEP Air Levels: Emissions Calculations

Overview
The Emissions Calculations method allows you to account for efforts you have taken to reduce the amount of air emissions from your facility in determining your PrintSTEP Air Level. This may include use of low-VOC and non-HAP products, retention factors for lithography, capture efficiency and destruction removal efficiency figures. For you to take credit for these changes, you must use the Emissions Calculations Method, and any emission controls must be made enforceable in order for you to take credit for these controls.

If you have multiple printing processes on site (e.g., a sheetfed non-heatset offset press and a heatset web offset press) you will not be able to use the Materials Use method in Chapter 6 and you must determine your emissions using the Emissions Calculations method. Instructions for determining your PrintSTEP Level for air using the Emissions Calculations method follow.

1. GATHER BACKGROUND INFORMATION

- Review the *Process Tables* on the following pages and find the one(s) that describes your printing process(es). Look at the list of "VOC-containing Materials" in the first column of the appropriate Process Table(s). For each of these materials gather the following:

- 1. Page records (e.g., purchase, inventory records) of this material from the past 12 months;
- 2. Product data sheets, MSDSs, and information from suppliers for these materials, and
- 3. Destruction Removal Efficiencies and Capture Efficiencies of your pollution control equipment.

NOTE!! You must check your records to see if you use any type of materials in your printing process other than those listed in the *VOC-containing Materials* column. If these "other" materials constitute more than 10% of the VOCs or HAPs used in your facility, you must list these in the "Other materials" row.

2. COMPLETE THE APPLICABLE PROCESS TABLES

- If you have a ***controlled heatset web offset lithographic press***, you will have to fill in the shaded cells in the Process Table with the pollution control equipment's Destruction Removal Efficiency (DRE). Also, complete the calculations according to the column headers in the Process Table(s).
- If you have a ***controlled flexographic or rotogravure press with solvent-based ink***, you will need to fill in the shaded cells in the Process Table with the Destruction Removal Efficiency (DRE) and Capture Efficiency figures for your pollution control devices. Also, complete the calculations according to the column headers in the Process Table(s).
- For all other types of presses, the Process Table is already complete.

Process Table:

CONTROLLED HEATSET WEB OFFSET LITHOGRAPHY

	Column A		Column B
VOC-CONTAINING MATERIALS	**VOC EMISSIONS FACTOR[1] (before controls)**	**DESTRUCTION REMOVAL EFFICIENCY (DRE) of control device Fill in shaded cells**	**MULTIPLIER for emissions after controls Fill in shaded cells using: 1 - DRE**
Ink[2] (lbs)	0.80 (due to 20% retention factor)		
Hand Cleaning Solvent (gal)	0.50 [3] (due to 50% retention factor)	0	1
Automatic Blanket Wash (thru a control device) (gal)	0.40[4]		
Automatic Blanket Wash (NOT thru a control device) (gal)	0.60	0	1
Fountain Solution Concentrate/Additive (gal) (thru a control device)	0.70[5]		
Fountain Solution Concentrate/Additive (gal) (NOT thru a control device)	0.30	0	1
Adhesives and coatings (gal) (thru a control device)			
Adhesives and coatings (gal) (NOT thru a control device)		0	1
Other VOC-containing Materials			

[1] VOC Emissions factors (retention, and dryer carryover) are from the 1993 EPA draft CTG for Offset Lithography and the 1994 ACT for Offset Lithography.

[2] Ink includes lithographic varnishes and additives.

[3] 50% retention in shop towels can be used only if soiled towels are kept in a closed container and the vapor pressure of the cleaning solvent is less than 10mmHg at 200C. All others use 1.0.

[4] Applies only if the wash has a vapor pressure less than 10mmHg at 20□C.

[5] For alcohol substitutes only, use 0.70 reflecting 70% dryer carryover.

Process Table:
UNCONTROLLED HEATSET WEB OFFSET LITHOGRAPHY

	Column A	Column B
VOC-CONTAINING MATERIALS	**VOC EMISSIONS FACTOR[1] (before controls)**	**MULTIPLIER for uncontrolled processes**
Ink[1]	0.80	1
Hand Cleaning Solvent (gal)	0.50[2]	1
Automatic Blanket Wash (gal)	1	1
Fountain Solution Concentrate/Additive (gal)	1	1
Adhesives and Coating	1	1
Other VOC-containing Materials	1	1

Process Table:
NON-HEATSET WEB or SHEETFED OFFSET LITHOGRAPHY

	Column A	Column B
VOC-CONTAINING MATERIALS	**VOC EMISSIONS FACTOR[1] (before controls)**	**MULTIPLIER for uncontrolled processes**
Ink (lbs)[1, 6]	0.05	1
Hand Cleaning Solvent (gal)	0.50[2]	1
Automatic Blanket Wash (gal)	1	1
Fountain Solution Concentrate/Additive (gal)	1	1
Adhesives and Coatings	1	1
Other VOC-containing Materials	1	1

[6] Does not apply to UV-cured material

Process Table:

SCREEN PRINTING or FLEXOGRAPHY or ROTOGRAVURE: WATER-BASED INKS UNCONTROLLED FLEXOGRAPHY or ROTOGRAVURE: SOLVENT-BASED INKS

	Column A	Column B
VOC-CONTAINING MATERIALS	**VOC EMISSIONS FACTOR (before controls)**	**MULTIPLIER for uncontrolled processes**
Ink (gal)	1	1
Ink Dilution Solvent (lbs)	1	1
Coating (gal)	1	1
Adhesive (gal)	1	1
Cleaning Solvent (gal)	1	1
Other VOC-containing Materials	1	1

Process Table:

CONTROLLED FLEXOGRAPHY or ROTOGRAVURE: SOLVENT-BASED INKS

	Column A			Column B
VOC-CONTAINING MATERIALS	**VOC EMISSIONS FACTOR (before controls)**	**CAPTURE EFFICIENCY (CE) of control device** **Fill in column.**	**DESTRUCTION REMOVAL EFFICIENCY (DRE) of control device** **Fill in column.**	**MULTIPLIER for emissions after controls** **Calculate shaded cells using following equation: 1 - (CE x DRE)**
Ink (gal)	1			
Ink Dilution Solvent (gal)	1			
Coating (gal)	1			
Adhesive (gal)	1			
Cleaning Solvent (gal)	1			
Other VOC-containing Materials	1			

3. FILL IN THE EMISSIONS WORKSHEET

- You must fill out the Emissions Worksheet going from left to right, and completing each row before going on to the next. **THIS IS VERY IMPORTANT**.
- sample material is listed to clarify the directions below.

COLUMN 1

- Your Process Table lists the product categories whose VOC and HAP content will determine your PrintSTEP Air Level -- for example, inks, fountain solutions, cleaning solvent, and adhesives and coatings for lithography.
- Start with the first product listed in the Process Table(s) you filled out for your facility on pages E-2, E-3, and E-4.
- Write the name of product in Column 1.
- Fill in the row for ONE PRODUCT AT A TIME, completing the an entire row BEFORE going to the next.
- If you use more than one printing process, complete the table for one process at a time, using the appropriate Process Tables as necessary.

COLUMN 2

- Fill in Column 2 with the material's brand name, as given on your product data sheets or MSDSs.

COLUMN 3

- If the amount of material used is in gallons, convert to pounds by multiplying by the density (lbs/gal) of the product.
- Using your purchasing and inventory records, write down the pounds of product used during the past 12 months.

COLUMN 4

- "Column A" in your Process Table gives the emission factors for each material you listed.
- Copy the appropriate data in "Column A" from your Process Table, into Column 4 of the Emissions Worksheet.

COLUMN 5

- "Column B" in your Process Table gives the pollution control device multiplier for each product you listed in Column 1. This number will be a 1 for uncontrolled processes.
- Copy the appropriate data in "Column B" from your Process Table, into Column 4 of the Emissions Worksheet.

COLUMN 6

- Calculate your subtotal using the following equation:
- Column 6 = (Column 3) x (Column 4) x (Column 5)

COLUMN 7

- Find the VOC content of each material on the MSDS or product data sheets. Verify with your supplier. Values used must be consistent with values that would be obtained with EPA Method 24 for VOCs.
- Write this down in Column 7. VOC content must be entered into Column 7 as a fraction. This is the percentage by weight divided by 100 to get the weight fraction.
- You do not need to list different VOCs within a material on separate lines. You just need to list the total VOC content of every material.

COLUMN 8

- Calculate your VOC emissions by using the following equation:
- Column 8 = (Column 6) x (Column 7)
- Make sure your VOC emissions figure is in pounds.

WRAPPING UP

- When you finish filling out the table with all of your materials' individual VOC emissions, calculate the totals in the boxes at the bottom of Columns 8.
- Add up all of the entries in each column to find the grand total.

Emissions Worksheet:

(1) (2) (3) (4) (5) (6)

Material Category	Material Name	Amount Used (lbs)	Column A from process table	Column B from process table	Multiply Columns (3) x (4) x (5)
Ink	INKCO Red 442 heatset web offset lithography	10,000 lbs	0.80	0.10	800

Emissions Worksheet: (continued)

(7)	(8)
VOC Content (weight fraction)	**VOC emissions Col (6)x(10)**
0.50	400
-----	-----
Total VOC emissions:	

4. DETERMINE YOUR PrintSTEP AIR LEVEL BASED ON VOC EMISSIONS

- Look at the total pounds of VOC emissions that you calculated at the bottom of Column 8 of your Emissions Worksheet.
- GO to the Emissions Worksheet Air Level Table on page E-10.
- Find the column for your facility's location.
- **Within that column**, find the range into which your total VOC Emission (from the Emissions Worksheet Air Level Table) falls.
- Follow this row across to the right to the "PrintSTEP Level" column. Circle the PrintSTEP Air Level you find.
- Write that PrintSTEP Air Level:_____

5. DETERMINE YOUR FINAL PrintSTEP AIR LEVEL

- Compare the Levels circled in Part 4 above.
- The highest PrintSTEP Air Level is your final Level.
- Write your final PrintSTEP Air Level here: _____

Emissions Table:

for use with calculated VOC and HAP totals from the Emissions Worksheet

	VOCs	PrintSTEP VOC Level	HAPs	PrintSTEP HAP Level
Total Pounds of VOC or HAP emissions from materials used in the last 12 months	less than 10,000 pounds	**LEVEL 1** (<10% VOC major source threshold)	less than 10,000 lbs of any HAP **AND** less than 25,000 lbs of all HAPs	**LEVEL 1**
	10,000-20,000 pounds	**LEVEL 2** (. 10% and < 25% VOC major source threshold)	more than 10,000 lbs of any HAP **OR** more than 25,000 lbs of all HAPs	**LEVEL 2**
	20,000-50,000 pounds	**LEVEL 3** (. 25% and <50% VOC major source threshold)	more than 20,000 lbs of any HAP **OR** more than 50,000 lbs of all HAPs	**LEVEL 3**
	50,000-100,000 pounds	**LEVEL 4** (. 50% and <100% VOC major source threshold)		
	more than 100,000 pounds	**LEVEL 5** (. 100% VOC major source threshold)		

Appendix F:
List of NH Regulated Toxic Air Pollutants

Taken from NH Code of Administrative Rules, Chapter Env-A 1400

Table 1450-1

CAS Number	Description	OEL (mg/m^3)	Toxicity Class[A]	Time Category[B]	24-Hr AAL ($\mu g/m^3$)	Annual AAL ($\mu g/m^3$)	24-Hr Deminimus[C] (lb/hr)	Annual Deminimus (lb/yr)
0 - 00 - 0	Mineral Wool Fibers	10	II	A	141	34	1.32E-02	1.10E+02
0 - 00 - 0	Welding Fumes (not otherwise classified)	5	II	D	25	17	2.35E-03	5.50E+01
0 - 00 - 0	Coal Dust (bituminous)	0.9	II	D	4.527	3.018	4.24E-04	9.90E+00
0 - 00 - 0	Coal Dust (anthracite)	0.4	II	D	2.012	1.341	1.88-E-04	4.40E+00
0 - 00 - 0	Fibrous Glass Dust	10	II	A	141	34	1.32E-02	1.10E+02
0 - 00 - 0	Fluorides, as F	2.5	I	D	8.929	5.952	8.36E-04	1.95E+01
0 - 00 - 0	Grain Dust (Oat, Wheat, Barley)	4	II	D	20	13	1.88E-03	4.40E+01
0 - 00 - 0	Iron Salts, soluble	1	III	A	42	9.921	3.90E-03	3.25E+01
0 - 00 - 0	Soapstone (Inhalable Dust)	6	II	D	30	20	2.83E-03	6.60E+01
0 - 00 - 0	Vegetable Oil Mists	10	III	A	417	99	3.90E-02	3.25E+02
0 - 00 - 0	Soapstone (Respirable Dust)	3	II	D	15	10	1.41E-03	3.30E+01
0 - 00 - 0	Cotton	0.2	III	D	2.976	1.984	2.79E-04	6.51E+00
0 - 00 - 0	Rouge	10	II	D	50	34	4.71E-03	1.10E+02
0 - 00 - 0	Polytetraflouroethylene, decomp. products		II	D				**
0 - 00 - 0	Stearates	10	II	D	50	34	4.71E-03	1.10E+02
0 - 00 - 0	Wood Dust (Soft Woods)	5	I	D	18	12	1.67E-03	3.91E+01
0 - 00 - 0	Special Purpose Glass Fiber (length>5,diam<3)	1 f/cc*	II	D				**
0 - 00 - 0	Slag Wool Fibers (length>5,diam.<3)	1 f/cc	II	D				**
0 - 00 - 0	Rock Wool Fibers (length>5,diam.<3)	1 f/cc	II	D				**
0 - 00 - 0	Glass Wool Fibers (length>5,diam.<3)	1 f/cc	II	D				**
0 - 00 - 0	Continuous Filament Glass Fiber (respirable)	1 f/cc	II	A				**
0 - 00 - 0	Continuous Filament Glass Fibers (Inhalable)	5	II	A	70	17	6.59E-03	5.50E+01
0 - 00 - 0	Wood Dust (Hard Woods)	1	I	D	3.571	2.381	3.34E-04	7.81E+00
50 - 00 - 0	Formaldehyde	0.37	I	D	1.321	0.881	1.24E-04	2.89E+00
50 - 29 - 3	DDT	1	I	D	3.571	2.381	3.34E-04	7.81E+00

Table 1450-1

CAS Number	Description	OEL (mg/m^3)	Toxicity Class[A]	Time Category[B]	24-Hr AAL ($\mu g/m^3$)	Annual AAL ($\mu g/m^3$)	24-Hr Deminimus[C] (lb/hr)	Annual Deminimus (lb/yr)
50-32-8	Benzo[a]pyrene	0.1	I	D	0.005	0.005	4.48E-07	1.57E-02
50-78-2	Acetylsalicylic acid	5	I	B	25	12	2.34E-03	3.91E+01
51-28-5	2,4-Dinitrophenol							**
51-79-6	Ethyl Carbamate (Urethane)							**
53-96-3	2-Acetylaminofluorene		I	D				**
54-11-5	Nicotine	0.5	I	D	1.786	1.190	1.67E-04	3.91E+00
55-38-9	Fenthion	0.2	I	D	0.714	0.476	6.69E-05	1.56E+00
55-63-0	Nitroglycerin (NG)	0.46	I	D	1.643	1.095	1.54E-04	3.59E+00
56-23-5	Carbon tetrachloride	31	I	D	111	74	1.04E-02	2.42E+02
56-38-2	Parathion	0.1	I	D	0.357	0.238	3.34E-05	7.81E-01
56-55-3	Benz[a]anthracene	0.1	I	D	0.357	0.238	3.34E-05	7.81E-01
56-81-5	Glycerin mist	10	I	D	36	24	3.34E-03	7.81E+01
57-12-5	Cyanide	5	I	D	18	12	1.67E-03	3.91E+01
57-14-7	1,1-Dimethylhydrazine	0.025	I	D	0.089	0.060	8.36E-06	1.95E-01
57-24-9	Strychnine	0.15	I	D	0.536	0.357	5.02E-05	1.17E+00
57-50-1	Sucrose	10	II	D	50	34	4.71E-03	1.10E+02
57-57-8	Propiolactone	1.5	I	B	7.500	3.571	7.02E-04	1.17E+01
57-74-9	Chlordane	0.5	I	D	1.786	0.700	1.67E-04	2.30E+00
58-89-9	Lindane	0.5	I	D	1.786	1.190	1.67E-04	3.91E+00
59-89-2	N-Nitrosomorpholine							**
60-11-7	4-Dimethylaminoazobenzene		I	D				**
60-29-7	Ethyl ether	1210	I	D	4321	2881	4.05E-01	9.45E+03
60-34-4	Methyl hydrazine	0.019	I	D	0.068	0.045	6.35E-06	1.48E-01
60-35-5	Acetamide							**
60-57-1	Dieldrin	0.25	I	D	0.893	0.595	8.36E-05	1.95E+00
61-82-5	Amitrole	0.2	I	D	0.714	0.476	6.69E-05	1.56E+00

Table 1450-1

CAS Number	Description	OEL (mg/m^3)	Toxicity Class[A]	Time Category[B]	24-Hr AAL (g/m^3)	Annual AAL (g/m^3)	24-Hr Deminimus[C] (lb/hr)	Annual Deminimus (lb/yr)
62-53-3	Aniline	7.6	I	D	27	1	2.54E-03	3.28E+00
62-73-7	Dichlorvos	0.9	I	D	3.214	0.500	3.01E-04	1.64E+00
62-74-8	Sodium fluoroacetate	0.05	I	D	0.179	0.119	1.67E-05	3.91E-01
62-75-9	N-Nitrosodimethylamine		I	D	0.001	0.001	6.55E-08	2.30E-03
63-25-2	Carbaryl	5	I	D	18	12	1.67E-03	3.91E+01
64-17-5	Ethanol	1880	II	D	9457	6304	8.85E-01	2.07E+04
64-18-6	Formic acid	9.4	II	B	66	32	6.20E-03	1.03E+02
64-19-7	Acetic Acid	25	II	D	126	84	1.18E-02	2.75E+02
64-67-5	Diethyl Sulfate	0.2	II	D	1.006	0.671	9.42E-05	2.20E+00
67-56-1	Methanol	262	II	D	1318	879	1.23E-01	2.88E+03
67-63-0	Isopropryl alcohol	983	II	D	4945	3296	4.63E-01	1.08E+04
67-64-1	Acetone	1188	I	D	4243	2829	3.97E-01	9.28E+03
67-66-3	Chloroform	49	I	D	175	117	1.64E-02	3.83E+02
67-72-1	Hexachloroethane	9.7	I	D	35	23	3.24E-03	7.58E+01
68-11-1	Thioglycolic acid	3.8	I	B	19	9.048	1.78E-03	2.97E+01
68-12-2	Dimethylformamide	30	I	D	107	30	1.00E-02	9.84E+01
71-23-8	n-Propyl alcohol	492	II	B	3465	1650	3.24E-01	5.41E+03
71-36-3	n-Butanol	152	II	C	856	510	8.02E-02	1.67E+03
71-43-2	Benzene	1.6	I	D	5.714	3.810	5.35E-04	1.25E+01
71-55-6	Methyl chloroform	1910	I	D	6821	4548	6.39E-01	1.49E+04
72-20-8	Endrin	0.1	I	D	0.357	0.238	3.34E-05	7.81E-01
72-43-5	Methoxychlor	10	I	D	36	24	3.34E-03	7.81E+01
72-55-9	DDE (1,1-Dichloro-2,2-Bis(P-Chlorophenyl)		I	D	0.103	0.103	9.64E-06	3.38E-01
74-83-9	Methyl bromide	3.9	II	D	20	5	1.84E-03	1.64E+01
74-87-3	Methyl chloride	103	I	D	368	245	3.44E-02	8.05E+02

Table 1450-1

CAS Number	Description	OEL (mg/m^3)	Toxicity Class[A]	Time Category[B]	24-Hr AAL ($\mu g/m^3$)	Annual AAL ($\mu g/m^3$)	24-Hr Deminimus[C] (lb/hr)	Annual Deminimus (lb/yr)
74-88-4	Methyl iodide	12	II	D	60	40	5.65E-03	1.32E+02
74-89-5	Methylamine	6.4	II	B	45	21	4.22E-03	7.04E+01
74-90-8	Hydrogen cyanide	5	I	D	18	3	1.67E-03	9.84E+00
74-93-1	Methyl mercaptan	0.98	II	D	4.930	3.286	4.62E-04	1.08E+01
74-96-4	Ethyl bromide	22	II	D	111	74	1.04E-02	2.42E+02
74-97-5	Chlorobromomethane	1060	II	D	5332	3555	4.99E-01	1.17E+04
74-99-7	Methyl acetylene	1640	II	D	8249	5500	7.72E-01	1.80E+04
74-99-7	Methyl acetylene-propadiene mixture	1640	II	D	8249	5500	7.72E-01	1.80E+04
75-00-3	Ethyl chloride	264			10000	10000	9.36E-01	3.28E+04
75-01-4	Vinyl chloride	13	I	D	46	31	4.35E-03	1.02E+02
75-04-7	Ethylamine	9.2	II	D	46	31	4.33E-03	1.01E+02
75-05-8	Acetonitrile	67	I	D	239	160	2.24E-02	5.23E+02
75-07-0	Acetaldehyde	45	I	D	161	9	1.50E-02	2.95E+01
75-08-1	Ethyl mercaptan	1.3	II	B	9.155	4.359	8.57E-04	1.43E+01
75-09-2	Methylene Chloride (Dichloromethane)	174	I	D	621	414	5.82E-02	1.36E+03
75-12-7	Formamide	18	II	D	91	60	8.48E-03	1.98E+02
75-15-0	Carbon disulfide	31	I	D	700	700	6.55E-02	2.30E+03
75-21-8	Ethylene oxide	1.8	I	D	6.429	4.286	6.02E-04	1.41E+01
75-25-2	Bromoform	5.2	I	D	19	12	1.74E-03	4.06E+01
75-31-0	Isopropylamine	12	II	B	85	40	7.91E-03	1.32E+02
75-34-3	1,1-Dichloroethane	405	II	D	2037	1358	1.91E-01	4.46E+03
75-35-4	Vinylidene chloride	20	II	D	101	67	9.42E-03	2.20E+02
75-43-4	Dichlorofluoromethane	42	II	D	211	141	1.98E-02	4.62E+02
75-44-5	Phosgene	0.4	I	D	1.429	0.952	1.34E-04	3.12E+00
75-45-6	Chlorodifluoromethane	3540			50000	50000	4.68E+00	1.64E+05

Table 1450-1

CAS Number	Description	OEL (mg/m^3)	Toxicity Class[A]	Time Category[B]	24-Hr AAL ($\mu g/m^3$)	Annual AAL ($\mu g/m^3$)	24-Hr Deminimus[C] (lb/hr)	Annual Deminimus (lb/yr)
75-47-8	Iodoform	10	II	B	70	34	6.59E-03	1.10E+02
75-50-3	Trimethylamine	12	II	D	60	40	5.65E-03	1.32E+02
75-52-5	Nitromethane	50	III	D	744	496	6.97E-02	1.63E+03
75-55-8	Propylene imine	4.7	I	D	17	11	1.57E-03	3.67E+01
75-56-9	Propylene oxide	48	I	D	171	30	1.61E-02	9.84E+01
75-61-6	Difluorodibromomethane	858	III	B	17875	8512	1.67E+00	2.79E+04
75-63-8	Trifluorobromomethane	6090	III	D	90625	60417	8.48E+00	1.98E+05
75-65-0	tert-Butanol	303	II	B	2134	1016	2.00E-01	3.33E+03
75-69-4	Trichlorofluoromethane	5620	II	D	28270	18846	2.65E+00	6.18E+04
75-71-8	Dichlorodifluoromethane	4950	III	D	73661	49107	6.90E+00	1.61E+05
75-74-1	Tetramethyl lead, as Pb	0.15	I	D	0.536	0.357	5.02E-05	1.17E+00
75-86-5	Acetone cyanohydrin	5	I	D	18	12	1.67E-03	3.91E+01
75-99-0	2,2-Dichloropropionic acid	5.8	III	D	86	58	8.08E-03	1.89E+02
76-03-9	Trichloroacetic acid	6.7	II	D	34	22	3.16E-03	7.37E+01
76-06-2	Chloropicrin	0.67	I	B	3.350	1.595	3.14E-04	5.23E+00
76-11-9	1,1,1,2-Tetrachloro-2,2-difluoroethane	4170	II	D	20976	13984	1.96E+00	4.59E+04
76-12-0	1,1,2,2,-Tetrachloro-1,2-difluorethane	4170	II	D	20976	13984	1.96E+00	4.59E+04
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	7670	II	D	38581	25721	3.61E+00	8.44E+04
76-14-2	Dichlorotetrafluoroethane	6990	III	D	104018	69345	9.74E+00	2.28E+05
76-15-3	Chloropentafluoroethane	6320	III	A	263333	62698	2.47E+01	2.06E+05
76-22-2	Camphor, synthetic	12	II	B	85	40	7.91E-03	1.32E+02
76-44-8	Heptachlor	0.05	I	D	0.179	0.119	1.67E-05	3.91E-01
77-47-4	Hexachlorocyclopentadiene	0.11	II	D	0.553	0.369	5.18E-05	1.21E+00
77-58-7	Dibutyltin Dilaurate (as Tin, organic cmpds)	0.1	I	D	0.357	0.238	3.34E-05	7.81E-01
77-73-6	Dicyclopentadiene	27	I	D	96	64	9.03E-03	2.11E+02

Table 1450-1

CAS Number	Description	OEL (mg/m^3)	Toxicity Class[A]	Time Category[B]	24-Hr AAL ($\mu g/m^3$)	Annual AAL ($\mu g/m^3$)	24-Hr Deminimus[C] (lb/hr)	Annual Deminimus (lb/yr)
77-78-1	Dimethyl sulfate	0.52	I	D	1.857	1.238	1.74E-04	4.06E+00
78-00-2	Tetraethyl lead, as Pb	0.1	I	D	0.357	0.238	3.34E-05	7.81E-01
78-10-4	Ethyl silicate	85	III	D	1265	843	1.18E-01	2.77E+03
78-30-8	Triorthocresyl phosphate	0.1	II	D	0.503	0.335	4.71E-05	1.10E+00
78-34-2	Dioxathion	0.2	I	D	0.714	0.476	6.69E-05	1.56E+00
78-59-1	Isophorone	28	II	D	141	94	1.32E-02	3.08E+02
78-78-4	Pentane	1770	III	B	36875	17560	3.45E+00	5.76E+04
78-83-1	Isobutyl alcohol	152	II	D	765	510	7.16E-02	1.67E+03
78-87-5	Propylene dichloride	347	II	D	1745	4	1.63E-01	1.31E+01
78-92-2	sec-Butanol	303	II	B	2134	1016	2.00E-01	3.33E+03
78-93-3	Methyl ethyl ketone (MEK)	590			1000	1000	9.36E-02	3.28E+03
78-95-5	Chloroacetone	3.8	I	C	15	9.048	1.42E-03	2.97E+01
79-00-5	1,1,2-Trichloroethane	55	II	D	277	184	2.59E-02	6.05E+02
79-01-6	Trichloroethylene	269	I	D	961	640	8.99E-02	2.10E+03
79-04-9	Chloroacetyl chloride	0.23	II	B	1.620	0.771	1.52E-04	2.53E+00
79-06-1	Acrylamide	0.03	I	D	0.107	0.071	1.00E-05	2.34E-01
79-09-4	Propionic acid	30	II	B	211	101	1.98E-02	3.30E+02
79-10-7	Acrylic acid	5.9	I	D	21	1	1.97E-03	3.28E+00
79-11-8	Chloroacetic Acid							**
79-20-9	Methyl acetate	606	III	D	9018	6012	8.44E-01	1.97E+04
79-24-3	Nitroethane	307	III	D	4568	3046	4.28E-01	9.99E+03
79-27-6	Acetylene tetrabromide	14	II	D	70	47	6.59E-03	1.54E+02
79-34-5	1,1,2,2-Tetrachloroethane	6.9	I	D	25	16	2.31E-03	5.39E+01
79-41-4	Methacrylic acid	70	II	D	352	235	3.30E-02	7.70E+02
79-44-7	Dimethyl carbamoyl chloride		I	D				**

Table 1450-1

CAS Number	Description	OEL (mg/m^3)	Toxicity Class[A]	Time Category[B]	24-Hr AAL ($\mu g/m^3$)	Annual AAL ($\mu g/m^3$)	24-Hr Deminimus[C] (lb/hr)	Annual Deminimus (lb/yr)
79-46-9	2-Nitropropane	36	I	D	129	20	1.20E-02	6.56E+01
80-62-6	Methyl Methacrylate	410	I	D	1464	700	1.37E-01	2.30E+03
81-81-2	Warfarin	0.1	I	D	0.357	0.238	3.34E-05	7.81E-01
82-68-8	Pentachloronitrobenzene	0.5	I	D	1.786	1.190	1.67E-04	3.91E+00
83-26-1	Pindone	0.1	I	D	0.357	0.238	3.34E-05	7.81E-01
83-79-4	Rotenone	5	I	D	18	12	1.67E-03	3.91E+01
84-66-2	Diethyl phthalate	5	II	D	25	17	2.35E-03	5.50E+01
84-74-2	Dibutyl phthalate	5	II	D	25	17	2.35E-03	5.50E+01
85-01-8	Phenanthrene (as coal tar pitch volatile)	0.2	I	D	0.714	0.476	6.69E-05	1.56E+00
85-44-9	Phthalic anhydride	6.1	I	D	22	15	2.04E-03	4.77E+01
86-50-0	Azinphos-methyl	0.2	I	D	0.714	0.476	6.69E-05	1.56E+00
86-88-4	ANTU	0.3	I	D	1.071	0.714	1.00E-04	2.34E+00
87-68-3	Hexachlorobutadiene	0.21	I	B	1.050	0.500	9.83E-05	1.64E+00
87-86-5	Pentachlorophenol	0.5	I	D	1.786	1.190	1.67E-04	3.91E+00
88-06-2	2,4,6-Trichlorophenol		I	D	3	3	2.81E-04	9.84E+00
88-72-2	Nitrotoluene	11	I	D	39	26	3.68E-03	8.59E+01
88-89-1	Picric acid	0.1	II	D	0.503	0.335	4.71E-05	1.10E+00
89-72-5	o-sec-Butylphenol	31	II	B	218	104	2.04E-02	3.41E+02
90-04-0	o-Anisidine	0.5	II	D	2.515	1.677	2.35E-04	5.50E+00
91-08-7	2,6-Toluene Diisocyanate (as TDI)	0.036	I	D	0.129	0.086	1.20E-05	2.81E-01
91-20-3	Naphthalene	52	I	D	186	3	1.74E-02	9.84E+00
91-22-5	Quinoline		I	D	0.003	0.003	2.68E-07	9.38E-03
91-59-8	B-Naphthlaminine	0.005	I	D	0.018	0.012	1.67E-06	3.91E-02
91-94-1	3,3-Dichlorobenzidine	0.1	I	D	0.078	0.078	7.28E-06	2.55E-01
92-52-4	Biphenyl	1.3	II	D	6.539	4.359	6.12E-04	1.43E+01

Table 1450-1

CAS Number	Description	OEL (mg/m^3)	Toxicity Class[A]	Time Category[B]	24-Hr AAL ($\mu g/m^3$)	Annual AAL ($\mu g/m^3$)	24-Hr Deminimus[C] (lb/hr)	Annual Deminimus (lb/yr)
92-67-1	4-Aminodiphenyl	0.0069	I	D	0.025	0.016	2.31E-06	5.39E-02
92-84-2	Phenothiazine	5	II	B	35	17	3.30E-03	5.50E+01
92-87-5	Benzidine	0.008	I	D	0.001	0.001	1.87E-08	6.56E-04
92-93-3	4-Nitro Diphenyl		I	D				**
93-76-5	2,4,5-T	10	I	D	36	24	3.34E-03	7.81E+01
94-36-0	Benzoyl peroxide	5	II	D	25	17	2.35E-03	5.50E+01
94-75-7	2,4-D	10	I	D	36	24	3.34E-03	7.81E+01
95-13-6	Indene	48	III	D	714	476	6.69E-02	1.56E+03
95-47-6	Xylene, o-isomers	434	I	D	1550	1033	1.45E-01	3.39E+03
95-48-7	o-Cresol	22	II	D	111	74	1.04E-02	2.42E+02
95-49-8	o-Chlorotoluene	259	I	D	925	617	8.66E-02	2.02E+03
95-50-1	o-Dichlorobenzene	150	I	D	536	357	5.02E-02	1.17E+03
95-52-4	Biphenyl	1.3	II	D	6.539	4.359	6.12E-04	1.43E+01
95-53-4	o-Toluidine	8.8	I	D	31	21	2.94E-03	6.87E+01
95-54-5	o-Phenylenediamine	0.1	I	D	0.357	0.238	3.34E-05	7.81E-01
95-63-6	1,2,4-Trimethylbenzene (as Trimethylbenzene)	123	II	D	619	412	5.79E-02	1.35E+03
95-80-7	Toluene-2,4-Diamine	2	I	D	7.143	4.762	6.69E-04	1.56E+01
95-95-4	2,4,5-Trichlorophenol							**
96-09-3	Styrene Oxide							**
96-12-8	1,2-Dibromo-3-Chloropropane	0.01	I	D	0.200	0.200	1.87E-05	6.56E-01
96-18-4	1,2,3-Trichloropropane	60	I	D	214	143	2.01E-02	4.69E+02
96-22-0	Diethyl ketone	705	II	B	4965	2364	4.65E-01	7.76E+03
96-33-3	Methyl acrylate	7	II	D	35	23	3.30E-03	7.70E+01
96-45-7	Ethylene Thiourea	0.2	I	D	0.972	0.972	9.36E-05	3.28E+00
96-69-5	4,4-Thiobis (6-tert-butyl-m-cresol)	10	II	D	50	34	4.71E-03	1.10E+02

Table 1450-1

CAS Number	Description	OEL (mg/m^3)	Toxicity Class[A]	Time Category[B]	24-Hr AAL (g/m^3)	Annual AAL (g/m^3)	24-Hr Deminimus[C] (lb/hr)	Annual Deminimus (lb/yr)
97-77-8	Disulfiram	2	I	D	7.143	4.762	6.69E-04	1.56E+01
98-00-0	Furfuryl alcohol	40	II	B	282	134	2.64E-02	4.40E+02
98-01-1	Furfural	7.9	II	D	40	26	3.72E-03	8.69E+01
98-07-7	Benzotrichloride	0.2	I	D	0.003	0.003	2.52E-07	8.83E-03
98-51-1	p-tert-Butyl toluene	6.1	II	D	31	20	2.87E-03	6.71E+01
98-82-8	Cumene	246	II	D	1237	400	1.16E-01	2.71E+03
98-83-9	Methyl styrene	242	II	B	1704	812	1.60E-01	2.66E+03
98-86-2	Acetophenone(incl:benzene from gasoline)	49	II	D	246	164	2.31E-02	5.39E+02
98-88-4	Benzoyl chloride	2.8	II	D	14	9.390	1.32E-03	3.08E+01
98-95-3	Nitrobenzene	5	I	D	18	12	1.67E-03	3.91E+01
99-08-1	Nitrotoluene	11	I	D	39	26	3.68E-03	8.59E+01
99-65-0	Dinitrobenzene	1	I	D	3.571	2.381	3.34E-04	7.81E+00
99-99-0	Nitrotoluene	11	I	D	39	26	3.68E-03	8.59E+01
100-00-5	p-Nitrochlorobenzene	0.64	I	D	2.286	1.524	2.14E-04	5.00E+00
100-01-6	p-Nitroaniline	3	I	D	11	7.143	1.00E-03	2.34E+01
100-02-7	4-Nitrophenol							**
100-21-0	Terephthalic acid	10	II	D	50	34	4.71E-03	1.10E+02
100-25-4	Dinitrobenzene	1	II	D	5.030	3.353	4.71E-04	1.10E+01
100-37-8	2-Diethylaminoethanol	9.6	II	D	48	32	4.52E-03	1.06E+02
100-40-3	4-Vinyl cyclohexene	0.44	II	D	2.213	1.476	2.07E-04	4.84E+00
100-41-4	Ethyl benzene	434			1000	1000	9.36E-02	3.28E+03
100-42-5	Styrene, monomer	85	I	D	1000	1000	9.36E-02	3.28E+03
100-44-7	Benzyl chloride	5.2	I	D	19	12	1.74E-03	4.06E+01
100-61-8	N-methyl aniline	2.2	III	A	92	22	8.58E-03	7.16E+01
100-63-0	Phenylhydrazine	0.44	II	D	2.213	1.476	2.07E-04	4.84E+00

Table 1450-1

CAS Number	Description	OEL (mg/m^3)	Toxicity Class[A]	Time Category[B]	24-Hr AAL (g/m^3)	Annual AAL (g/m^3)	24-Hr Deminimus[C] (lb/hr)	Annual Deminimus (lb/yr)
100-74-3	N-Ethylmorpholine	24	II	B	169	80	1.58E-02	2.64E+02
101-14-4	4,4-Methylene bis (2-chloroaniline)	0.11	I	D	0.393	0.262	3.68E-05	8.59E-01
101-68-8	Methylene bisphenyl isocyanate	0.051	I	D	0.182	0.020	1.71E-05	6.56E-02
101-77-9	4,4-Methylene dianiline	0.81	II	D	4.074	2.716	3.81E-04	8.91E+00
101-84-8	Phenyl ether	7	III	D	104	69	9.75E-03	2.28E+02
102-54-5	Dicyclopentadienyl iron	10	II	D	50	34	4.71E-03	1.10E+02
102-71-6	Triethanolamine	5	II	D	25	17	2.35E-03	5.50E+01
102-81-8	2-N-Dibutylaminoethanol	3.5	II	D	18	12	1.65E-03	3.85E+01
104-94-9	p-Anisidine	0.5	II	D	2.515	1.677	2.35E-04	5.50E+00
105-46-4	sec-Butyl acetate	950	III	A	39583	9425	3.71E+00	3.09E+04
105-60-2	Caprolactam, dust	1	I	D	3.571	2.381	3.34E-04	7.81E+00
105-60-2	Caprolactam, vapor	23	I	D	82	55	7.69E-03	1.80E+02
106-35-4	Ethyl butyl ketone	234	III	B	4875	2321	4.56E-01	7.62E+03
106-42-3	Xylene, p-isomers	434	I	D	1550	1033	1.45E-01	3.39E+03
106-44-5	p-Cresol	22	II	D	111	74	1.04E-02	2.42E+02
106-46-7	p-Dichlorobenzene	60			800	800	7.49E-02	2.62E+03
106-49-0	p-Toluidine	8.8	II	D	44	30	4.14E-03	9.68E+01
106-50-3	p-Phenylenediamine	0.1	II	D	0.503	0.335	4.71E-05	1.10E+00
106-51-4	Quinone	0.44	I	D	1.571	1.048	1.47E-04	3.44E+00
106-87-6	Vinyl cyclohexene dioxide	0.57	I	D	2.036	1.357	1.91E-04	4.45E+00
106-88-7	1,2-Epoxybutane				20	20	1.87E-03	6.56E+01
106-89-8	Epichlorohydrin	1.9	I	D	6.786	1	6.35E-04	3.28E+00
106-92-3	Allyl glycidyl ether	4.67	II	D	23	16	2.20E-03	5.14E+01
106-93-4	Ethylene dibromide	1	I	D	0.050	0.050	4.68E-06	1.64E-01
106-97-8	Butane	1900	III	D	28274	18849	2.65E+00	6.18E+04

Table 1450-1

CAS Number	Description	OEL (mg/m^3)	Toxicity Class[A]	Time Category[B]	24-Hr AAL ($\mu g/m^3$)	Annual AAL ($\mu g/m^3$)	24-Hr Deminimus[C] (lb/hr)	Annual Deminimus (lb/yr)
106-99-0	1,3 Butadiene	4.4	I	D	16	10	1.47E-03	3.44E+01
107-02-8	Acrolein	0.23	I	D	0.821	0.020	7.69E-05	6.56E-02
107-05-1	Allyl chloride	3	I	D	11	1	1.00E-03	3.28E+00
107-06-2	Ethylene dichloride	40	I	D	143	95	1.34E-02	3.12E+02
107-07-3	Ethylene chlorohydrin	3.3	I	D	12	7.857	1.10E-03	2.58E+01
107-13-1	Acrylonitrile	4.3	I	D	15	2	1.44E-03	6.56E+00
107-15-3	Ethylenediamine	25	II	B	176	84	1.65E-02	2.75E+02
107-18-6	Allyl alcohol	4.8	I	D	17	11	1.61E-03	3.75E+01
107-19-7	Propargyl alcohol	2.3	I	D	8.214	5.476	7.69E-04	1.80E+01
107-20-0	Chloroacetaldehyde	3.2	II	D	16	11	1.51E-03	3.52E+01
107-21-1	Ethylene glycol	100	II	D	503	335	4.71E-02	1.10E+03
107-30-2	Chloromethyl methyl ether		I	D				**
107-31-3	Methyl formate	246	III	A	10250	2440	9.60E-01	8.01E+03
107-41-5	Hexylene glycol	121	III	C	2017	1200	1.89E-01	3.94E+03
107-49-3	TEPP	0.047	I	D	0.168	0.112	1.57E-05	3.67E-01
107-66-4	Dibutyl phosphate	8.6	III	A	358	85	3.35E-02	2.80E+02
107-87-9	Methyl propyl ketone	705	III	B	14688	6994	1.38E+00	2.29E+04
107-98-2	Propylene glycol monomethyl ether	369	II	D	2000	2000	1.87E-01	6.56E+03
108-01-0	N-Dimethylaminoethanol	18	II	D	91	60	8.48E-03	1.98E+02
108-03-2	1-Nitropropane	91	II	D	458	305	4.29E-02	1.00E+03
108-05-4	Vinyl acetate	35	I	D	200	200	1.87E-02	6.56E+02
108-10-1	Methyl isobutyl ketone	205	I	B	1025	488	9.60E-02	1.60E+03
108-11-2	Methyl isobutyl carbinol	104	III	A	4333	1032	4.06E-01	3.39E+03
108-18-9	Diisopropylamine	21	II	B	148	70	1.38E-02	2.31E+02
108-20-3	Isopropyl ether	1040	III	B	21667	10317	2.03E+00	3.39E+04

Table 1450-1

CAS Number	Description	OEL (mg/m^3)	Toxicity Class[A]	Time Category[B]	24-Hr AAL (g/m^3)	Annual AAL (g/m^3)	24-Hr Deminimus[C] (lb/hr)	Annual Deminimus (lb/yr)
108-21-4	Isopropyl Acetate	1040	III	B	21667	10317	2.03E+00	3.39E+04
108-24-7	Acetic anhydride	21	II	B	148	70	1.38E-02	2.31E+02
108-31-6	Maleic anhydride	1	II	D	5.030	3.353	4.71E-04	1.10E+01
108-38-3	Xylene, m-isomers	434	I	D	1550	1033	1.45E-01	3.39E+03
108-39-4	m-Cresol	22	II	D	111	74	1.04E-02	2.42E+02
108-44-1	m-Toluidine	8.8	II	D	44	30	4.14E-03	9.68E+01
108-45-2	m-Phenylenediamine	0.1	I	D	0.357	0.238	3.34E-05	7.81E-01
108-46-3	Resorcinol	45	II	D	226	151	2.12E-02	4.95E+02
108-67-8	1,3,5-Trimethylbenzene (as Trimethylbenzene)	123	II	D	619	412	5.79E-02	1.35E+03
108-83-8	Disobutyl ketone	145	III	B	3021	1438	2.83E-01	4.72E+03
108-84-9	sec-Hexyl acetate	295	III	B	6146	2927	5.75E-01	9.60E+03
108-87-2	Methylcyclohexane	1610	III	D	23958	15972	2.24E+00	5.24E+04
108-88-3	Toluene	188	I	D	671	400	6.29E-02	1.31E+03
108-90-7	Chlorobenzene	46	II	D	231	154	2.17E-02	5.06E+02
108-91-8	Cyclohexylamine	41	I	D	146	98	1.37E-02	3.20E+02
108-93-0	Cyclohexanol	206	I	D	736	490	6.89E-02	1.61E+03
108-94-1	Cyclohexanone	100	II	D	503	335	4.71E-02	1.10E+03
108-95-2	Phenol	19	I	D	68	45	6.35E-03	1.48E+02
108-98-5	Phenyl mercaptan	2.3	I	D	8.214	5.476	7.69E-04	1.80E+01
109-59-1	Isopropoxyethanol	106	II	B	746	355	6.99E-02	1.17E+03
109-60-4	n-Propyl acetate	835	III	B	17396	8284	1.63E+00	2.72E+04
109-66-0	Pentane	1770	III	B	36875	17560	3.45E+00	5.76E+04
109-73-9	n-Butylamine	15	II	D	75	50	7.06E-03	1.65E+02
109-79-5	Butyl mercaptan	1.8	I	B	9	4.286	8.43E-04	1.41E+01
109-86-4	2-Methoxyethanol (EGME)	16			20	20	1.87E-03	6.56E+01

Table 1450-1

CAS Number	Description	OEL (mg/m^3)	Toxicity Class[A]	Time Category[B]	24-Hr AAL ($\mu g/m^3$)	Annual AAL ($\mu g/m^3$)	24-Hr Deminimus[C] (lb/hr)	Annual Deminimus (lb/yr)
109-87-5	Methylal	3110	II	D	15644	10429	1.46E+00	3.42E+04
109-89-7	Diethylamine	15	II	D	75	50	7.06E-03	1.65E+02
109-94-4	Ethyl formate	303	III	B	6312	3006	5.91E-01	9.86E+03
109-99-9	Tetrahydrofuran	590	II	D	2968	1979	2.78E-01	6.49E+03
110-12-3	Methyl isoamyl ketone	234	III	A	9750	2321	9.13E-01	7.62E+03
110-19-0	Isobutyl acetate	713	III	B	14854	7073	1.39E+00	2.32E+04
110-43-0	Methyl amyl ketone	233	III	B	4854	2312	4.54E-01	7.58E+03
110-49-6	2-Methoxyethyl acetate	24	II	D	121	80	1.13E-02	2.64E+02
110-54-3	Hexane (Other isomers)	1760	II	D	8853	200	8.29E-01	6.56E+02
110-54-3	Hexane (n-Hexane)	176	II	D	885	200	8.29E-02	6.56E+02
110-62-3	n-Valeraldehyde	176	II	B	1239	590	1.16E-01	1.94E+03
110-80-5	2-Ethoxyethanol (EGEE)	18			200	200	1.87E-02	6.56E+02
110-82-7	Cyclohexane	1030	II	D	5181	3454	4.85E-01	1.13E+04
110-83-8	Cyclohexene	1010	II	D	5080	3387	4.76E-01	1.11E+04
110-86-1	Pyridine	16	II	D	80	54	7.54E-03	1.76E+02
110-91-8	Morpholine	71	II	D	357	238	3.34E-02	7.81E+02
111-15-9	2-Ethoxyethyl acetate (EGEEA)	27	I	D	96	64	9.03E-03	2.11E+02
111-30-8	Glutaraldehyde	0.2	I	D	0.714	0.476	6.69E-05	1.56E+00
111-40-0	Diethylene triamine	4.2	I	B	21	10	1.97E-03	3.28E+01
111-42-2	Diethanolamine	2	I	B	10	4.762	9.36E-04	1.56E+01
111-44-4	Dichloroethyl ether	29	I	D	104	69	9.70E-03	2.27E+02
111-65-9	Octane	1400	I	B	7000	3333	6.55E-01	1.09E+04
111-69-3	Adiponitrile	8.8	I	B	44	21	4.12E-03	6.87E+01
111-76-2	2-Butoxyethanol	121	I	D	432	288	4.05E-02	9.45E+02
111-84-2	Nonane, all isomers	1050	III	D	15625	10417	1.46E+00	3.42E+04

Table 1450-1

CAS Number	Description	OEL (mg/m^3)	Toxicity Class[A]	Time Category[B]	24-Hr AAL (g/m^3)	Annual AAL (g/m^3)	24-Hr Deminimus[C] (lb/hr)	Annual Deminimus (lb/yr)
112-07-2	2-Butoxyethyl Acetate	131	II	D	659	439	6.17E-02	1.44E+03
114-26-1	Propoxur	0.5	I	D	1.786	1.190	1.67E-04	3.91E+00
115-29-7	Endosulfan	0.1	I	D	0.357	0.238	3.34E-05	7.81E-01
115-77-5	Pentaerythritol	10	II	D	50	34	4.71E-03	1.10E+02
115-86-6	Triphenyl phosphate	3	III	D	45	30	4.18E-03	9.76E+01
115-90-2	Fensulfothion	0.1	I	D	0.357	0.238	3.34E-05	7.81E-01
117-81-7	Di-sec-octyl phthalate	5	I	D	18	12	1.67E-03	3.91E+01
118-52-5	1,3-Dichloro-5,5-dimethyl hydantoin	0.2	II	B	1.408	0.671	1.32E-04	2.20E+00
118-74-1	Hexachlorobenzene	0.002	I	D	0.007	0.005	6.69E-07	1.56E-02
118-96-7	2,4,6-Trinitrotoluene	0.1	II	D	0.503	0.335	4.71E-05	1.10E+00
119-90-4	3,3'-Dimethoxybenzidine		I	D				**
119-93-7	o-Tolidine	0.02	I	D	0.071	0.048	6.69E-06	1.56E-01
120-80-9	Catechol	23	II	D	116	77	1.08E-02	2.53E+02
120-82-1	1,2,4-Trichlorobenzene	37	II	D	186	124	1.74E-02	4.07E+02
121-14-2	2,4-Dinitrotoluene		I	D	0.051	0.051	4.92E-06	1.73E-01
121-44-8	Triethylamine	4.1	II	D	21	7	1.93E-03	2.30E+01
121-45-9	Trimethyl phosphite	10	I	B	50	24	4.68E-03	7.81E+01
121-69-7	Dimethylaniline	25	II	D	126	84	1.18E-02	2.75E+02
121-75-5	Malathion	10	I	D	36	24	3.34E-03	7.81E+01
121-82-4	Cyclonite	0.5	I	D	1.786	1.190	1.67E-04	3.91E+00
122-39-4	Diphenylamine	10	II	D	50	34	4.71E-03	1.10E+02
122-60-1	Phenyl glycidyl ether (PGE)	0.6	I	D	2.143	1.429	2.01E-04	4.69E+00
122-66-7	1,2-Diphenylhydrazine		I	D	0.050	0.050	4.68E-06	1.64E-01
123-19-3	Dipropyl ketone	233	III	B	4854	2312	4.54E-01	7.58E+03
123-31-9	Hydroquinone	2	II	D	10	6.707	9.42E-04	2.20E+01

Table 1450-1

CAS Number	Description	OEL (mg/m^3)	Toxicity Class[A]	Time Category[B]	24-Hr AAL ($\mu g/m^3$)	Annual AAL ($\mu g/m^3$)	24-Hr Deminimus[C] (lb/hr)	Annual Deminimus (lb/yr)
123-38-6	Propionaldehyde							**
123-42-2	Diacetone alcohol	238	II	D	1197	798	1.12E-01	2.62E+03
123-51-3	Isoamyl alcohol	361	II	D	1816	1211	1.70E-01	3.97E+03
123-73-9	Crotonaldehyde	0.86	I	D	3.071	2.048	2.88E-04	6.72E+00
123-86-4	n-Butyl acetate	713	II	D	3587	2391	3.36E-01	7.84E+03
123-91-1	Dioxane	90	I	D	321	214	3.01E-02	7.03E+02
123-92-2	Isoamyl acetate	532	II	D	2676	1784	2.51E-01	5.85E+03
124-04-9	Adipic acid	5	III	B	104	50	9.75E-03	1.63E+02
124-09-4	1,6-Hexanediamine	2.3	II	D	12	7.713	1.08E-03	2.53E+01
124-38-9	Carbon dioxide	9000	II	D	45272	30181	4.24E+00	9.90E+04
124-40-3	Dimethylamine	9.2	II	D	46	31	4.33E-03	1.01E+02
126-73-8	Tributyl phosphate	2.2	II	D	11	7.378	1.04E-03	2.42E+01
126-98-7	Methylacrylonitrile	2.7	I	D	9.643	6.429	9.03E-04	2.11E+01
126-99-8	ß-Chloroprene	36	I	D	129	86	1.20E-02	2.81E+02
127-18-4	Perchloroethylene	170	I	D	607	405	5.68E-02	1.33E+03
127-19-5	N,N-Dimethylacetamide	36	I	D	129	86	1.20E-02	2.81E+02
128-37-0	2,6-Di-Tert-butyl-p-cresol	10	II	D	50	34	4.71E-03	1.10E+02
129-00-0	Pyrene (as coal tar pitch volatiles)	0.2	I	D	0.714	0.476	6.69E-05	1.56E+00
131-11-3	Dimethylphthalate	5	II	D	25	17	2.35E-03	5.50E+01
132-64-9	Dibenzofuran							**
133-06-2	Captan	5	I	D	18	12	1.67E-03	3.91E+01
133-90-4	Chloramben							**
134-32-7	A-Naphthylamine		II	D				**
135-88-6	N-Phenyl-beta-naphthylamine		I	D				**
136-78-7	Sesone	10	II	D	50	34	4.71E-03	1.10E+02
137-05-3	Methyl 2-cyanoacrylate	0.91	II	D	4.577	3.052	4.29E-04	1.00E+00

Table 1450-1

CAS Number	Description	OEL (mg/m^3)	Toxicity Class[A]	Time Category[B]	24-Hr AAL ($\mu g/m^3$)	Annual AAL ($\mu g/m^3$)	24-Hr Deminimus[C] (lb/hr)	Annual Deminimus (lb/yr)
137-26-8	Thiram	1	I	D	3.571	2.381	3.34E-04	7.81E+00
138-22-7	n-Butyl lactate	30	III	B	625	298	5.85E-02	9.76E+02
140-11-4	Benzyl acetate	61	II	D	307	205	2.87E-02	6.71E+02
140-88-5	Ethyl acrylate	20	I	D	71	48	6.69E-03	1.56E+02
141-32-2	n-Butyl acrylate	52	I	B	260	124	2.43E-02	4.06E+02
141-43-5	Ethanolamine	7.5	I	D	27	18	2.51E-03	5.86E+01
141-66-2	Dicrotophos	0.25	I	D	0.893	0.595	8.36E-05	1.95E+00
141-78-6	Ethyl acetate	1440	II	B	10141	4829	9.49E-01	1.58E+04
141-79-7	Mesityl oxide	60	II	D	302	201	2.83E-02	6.60E+02
142-64-3	Piperazine dihydrochloride	5	III	B	104	50	9.75E-03	1.63E+02
142-82-5	Heptane	1640	II	D	8249	5500	7.72E-01	1.80E+04
143-33-9	Sodium cyanide	5	I	D	18	12	1.67E-03	3.91E+01
144-62-7	Oxalic acid	1	II	D	5.030	3.353	4.71E-04	1.10E+01
148-01-6	Dinitolmide	5	II	B	35	17	3.30E-03	5.50E+01
150-76-5	4-Methoxyphenol	5	III	B	104	50	9.75E-03	1.63E+02
151-50-8	Potassium cyanide	5	I	D	18	12	1.67E-03	3.91E+01
151-56-4	Ethylenimine	0.88	I	D	3.143	2.095	2.94E-04	6.87E+00
151-67-7	Halothane	404	I	B	2020	962	1.89E-01	3.16E+03
156-59-2	1,2-Dichloroethylene (cis)	793	III	B	16521	7867	1.55E+00	2.58E+04
156-62-7	Calcium cyanamide	0.5	II	D	2.515	1.677	2.35E-04	5.50E+00
205-99-2	Benzo[b]fluoranthene	0.1	I	D	0.357	0.238	3.34E-05	7.81E-01
218-01-9	Chrysene	0.1	I	D	0.357	0.238	3.34E-05	7.81E-01
287-92-3	Cyclopentane	1720	III	D	25595	17063	2.40E+00	5.60E+04
298-00-0	Methyl parathion	0.2	I	D	0.714	0.476	6.69E-05	1.56E+00
298-02-2	Phorate	0.05	I	D	0.179	0.119	1.67E-05	3.91E-01

Table 1450-1

CAS Number	Description	OEL (mg/m^3)	Toxicity Class[A]	Time Category[B]	24-Hr AAL (g/m^3)	Annual AAL (g/m^3)	24-Hr Deminimus[C] (lb/hr)	Annual Deminimus (lb/yr)
298 - 04 - 4	Disulfoton	0.1	I	D	0.357	0.238	3.34E-05	7.81E-01
299 - 84 - 3	Ronnel	10	I	D	36	24	3.34E-03	7.81E+01
299 - 86 - 5	Crufomate	5	I	D	18	12	1.67E-03	3.91E+01
300 - 76 - 5	Naled	3	II	D	15	10	1.41E-03	3.30E+01
302 - 01 - 2	Hydrazine	0.013	I	D	0.046	0.031	4.35E-06	1.02E-01
309 - 00 - 2	Aldrin	0.25	I	D	0.893	0.595	8.36E-05	1.95E+00
314 - 40 - 9	Bromacil	10	I	D	36	24	3.34E-03	7.81E+01
330 - 54 - 1	Diuron	10	I	D	36	24	3.34E-03	7.81E+01
333 - 41 - 5	Diazinon	0.1	I	D	0.357	0.238	3.34E-05	7.81E-01
334 - 88 - 3	Diazomethane	0.34	I	D	1.214	0.810	1.14E-04	2.66E+00
353 - 50 - 4	Carbonyl fluoride	5.4	I	B	27	13	2.53E-03	4.22E+01
382 - 21 - 8	Perfluoroisobutylene	0.082	I	D	0.293	0.195	2.74E-05	6.41E-01
409 - 21 - 2	Silicon carbide	10	II	D	50	34	4.71E-03	1.10E+02
420 - 04 - 2	Cyanamide	2	II	B	14	6.707	1.32E-03	2.20E+01
460 - 19 - 5	Cyanogen	21	II	D	106	70	9.89E-03	2.31E+02
463 - 51 - 4	Ketene	0.86	I	D	3.071	2.048	2.88E-04	6.72E+00
463 - 58 - 1	Carbonyl Sulfide							**
463 - 82 - 1	Pentane	1770	III	B	36875	17560	3.45E+00	5.76E+04
479 - 45 - 8	Tetryl	1.5	II	D	7.545	5.030	7.06E-04	1.65E+01
504 - 29 - 0	2-Aminopyridine	1.9	I	D	6.786	4.524	6.35E-04	1.48E+01
506 - 64 - 9	Silver Cyanide (as hydrogen cyanide)	5	I	D	18	12	1.67E-03	3.91E+01
506 - 77 - 4	Cyanogen chloride	0.75	I	D	2.679	1.786	2.51E-04	5.86E+00
509 - 14 - 8	Tetranitromethane	0.04	I	D	0.143	0.095	1.34E-05	3.12E-01
510 - 15 - 6	Chlorobenzilate							**
528 - 29 - 0	Dinitrobenzene	1	II	D	5.030	3.353	4.71E-04	1.10E+01

Table 1450-1

CAS Number	Description	OEL (mg/m^3)	Toxicity Class[A]	Time Category[B]	24-Hr AAL (g/m^3)	Annual AAL (g/m^3)	24-Hr Deminimus[C] (lb/hr)	Annual Deminimus (lb/yr)
532-27-4	Chloroacetophenone	0.32	I	D	1.143	0.030	1.07E-04	9.84E-02
534-52-1	Dinitro-o-cresol	0.2	I	D	0.714	0.476	6.69E-05	1.56E+00
540-59-0	1,2-Dichloroethylene	793	III	B	16521	7867	1.55E+00	2.58E+04
540-84-1	2,2,4-Trimethylpentane							**
540-88-5	tert-Butyl acetate	950	III	A	39583	9425	3.71E+00	3.09E+04
541-85-5	Ethyl amyl ketone	131	III	B	2729	1300	2.56E-01	4.26E+03
542-75-6	1,3-Dichloropropene	4.5	I	D	20	20	1.87E-03	6.56E+01
542-88-1	Bis(Chloromethyl) ether	0.0047	I	D	0.017	0.011	1.57E-06	3.67E-02
542-92-7	Cyclopentadiene	203	II	D	1021	681	9.56E-02	2.23E+03
546-93-0	Magnesite	10	III	D	149	99	1.39E-02	3.25E+02
552-30-7	Trimellitic anhydride	0.04	II	D	0.201	0.134	1.88E-05	4.40E-01
556-52-5	Glycidol	6.1	I	B	30	15	2.86E-03	4.77E+01
557-05-1	Zinc Stearate	10	III	D	149	99	1.39E-02	3.25E+02
558-13-4	Carbon tetrabromide	1.4	III	D	21	14	1.95E-03	4.56E+01
563-12-2	Ethion	0.4	I	D	1.429	0.952	1.34E-04	3.12E+00
563-80-4	Methyl isopropyl ketone	705	II	B	4965	2364	4.65E-01	7.76E+03
583-60-8	o-Methylcyclohexanone	229	III	B	4771	2272	4.47E-01	7.45E+03
584-84-9	Toluene-2,4-Diisocyanate	0.036	I	D	0.129	0.086	1.20E-05	2.81E-01
591-78-6	Methyl n-butyl ketone	20	II	D	101	67	9.42E-03	2.20E+02
592-01-8	Calcium cyanide	5	I	D	18	12	1.67E-03	3.91E+01
592-41-6	1-Hexene	103	III	A	4292	1022	4.02E-01	3.35E+03
593-60-2	Vinyl bromide	22	I	D	79	3	7.36E-03	9.84E+00
594-42-3	Perchloromethyl mercaptan	0.76	I	D	2.714	1.810	2.54E-04	5.94E+00
594-72-9	1,1-Dichloro-1-nitroethane	12	II	B	85	40	7.91E-03	1.32E+02
598-78-7	2-Chloropropionic acid	0.44	I	B	2.200	1.048	2.06E-04	3.44E+00

Table 1450-1

CAS Number	Description	OEL (mg/m^3)	Toxicity Class[A]	Time Category[B]	24-Hr AAL ($\mu g/m^3$)	Annual AAL ($\mu g/m^3$)	24-Hr Deminimus[C] (lb/hr)	Annual Deminimus (lb/yr)
600 - 25 - 9	1-Chloro-1-nitropropane	10	II	B	70	34	6.59E-03	1.10E+02
603 - 34 - 9	Triphenyl amine	5	III	B	104	50	9.75E-03	1.63E+02
624 - 83 - 9	Methyl isocyanate	0.047	I	B	0.235	0.112	2.20E-05	3.67E-01
626 - 17 - 5	m-Phthalodinitrile	5	II	D	25	17	2.35E-03	5.50E+01
626 - 38 - 0	sec-Amyl acetate	665	III	D	9896	6597	9.27E-01	2.16E+04
627 - 13 - 4	n-Propyl nitrate	107	III	D	1592	1062	1.49E-01	3.48E+03
628 - 63 - 7	n-Amyl acetate	532	II	D	2676	1784	2.51E-01	5.85E+03
628 - 96 - 6	Ethylene glycol dinitrate	0.31	II	A	4.366	1.040	4.09E-04	3.41E+00
638 - 21 - 1	Phenylphosphine	0.23	I	D	0.821	0.548	7.69E-05	1.80E+00
680 - 31 - 9	Hexamethyl phosphoramide		II	D				**
681 - 84 - 5	Methyl silicate	6	I	D	21	14	2.01E-03	4.69E+01
684 - 16 - 2	Hexafluoroacetone	0.68	I	D	2.429	1.619	2.27E-04	5.31E+00
684 - 93 - 5	N-Nitroso-N-Methylurea							**
688 - 73 - 3	Tri-N-Butylstannane Hydride (as tin)	0.1	I	D	0.357	0.238	3.34E-05	7.81E-01
764 - 41 - 0	1,4,-Dichloro-2-butene	0.025	I	D	0.089	0.060	8.36E-06	1.95E-01
768 - 52 - 5	N-Isopropylaniline	11	II	B	77	37	7.25E-03	1.21E+02
822 - 06 - 0	Hexamethylene diisocyanate	0.034	I	D	0.121	0.010	1.14E-05	3.28E-02
872 - 50 - 4	Methylpyrrolidone	400	I	D	1429	952	1.34E-01	3.12E+03
944 - 22 - 9	Fonofos	0.1	I	D	0.357	0.238	3.34E-05	7.81E-01
999 - 61 - 1	2-Hydroxypropyl acrylate	2.8	I	B	14	6.667	1.31E-03	2.19E+01
1024 - 57 - 3	Heptachlor epoxide	0.05	I	D	0.179	0.119	1.67E-05	3.91E-01
1120 - 71 - 4	Propane sultone		I	D				**
1189 - 85 - 1	tert-Butyl chromate	0.1	III	C	1.667	0.992	1.56E-04	3.25E+00
1300 - 73 - 8	Xylidine (mixed isomers)	2.5	II	D	13	8.384	1.18E-03	2.75E+01
1302 - 74 - 5	Emery	10	III	D	149	99	1.39E-02	3.25E+02

Table 1450-1

CAS Number	Description	OEL (mg/m^3)	Toxicity Class[A]	Time Category[B]	24-Hr AAL ($\mu g/m^3$)	Annual AAL ($\mu g/m^3$)	24-Hr Deminimus[C] (lb/hr)	Annual Deminimus (lb/yr)
1303-86-2	Boron oxide	10	III	D	149	99	1.39E-02	3.25E+02
1303-96-4	Borates, tetra, sodium salts, Pentahydrate	1	I	D	3.571	2.381	3.34E-04	7.81E+00
1303-96-4	Borates, tetra, sodium salts, Decahydrate	5	II	D	25	17	2.35E-03	5.50E+01
1303-96-4	Borates, tetra, sodium salts, Anhydrous	1	I	D	3.571	2.381	3.34E-04	7.81E+00
1304-28-5	Barium Oxide (as barium)	0.5	II	D	2.515	1.677	2.35E-04	5.50E+00
1304-56-9	Beryllium Oxide (as beryllium)	0.002	I	D	0.02	0.02	1.87E-06	6.56E-02
1304-81-1	Bismuth Telluride, Se-doped	5	II	D	25	17	2.35E-03	5.50E+01
1304-82-1	Bismuth telluride	10	III	D	149	99	1.39E-02	3.25E+02
1305-62-0	Calcium hydroxide	5	III	B	104	50	9.75E-03	1.63E+02
1305-78-8	Calcium oxide	2	III	A	83	20	7.80E-03	6.51E+01
1306-19-0	Cadmium Oxide (as cadmium, respirable)	0.002	I	D	0.007	0.005	6.69E-07	1.56E-02
1309-37-1	Iron oxide dust & fume	5	II	D	25	17	2.35E-03	5.50E+01
1309-37-1	Iron Oxide	5	II	D	25	17	2.35E-03	5.50E+01
1309-48-4	Magnesium oxide fume	10	III	B	208	99	1.95E-02	3.25E+02
1309-64-4	Antimony trioxide	0.5	I	D	1.786	0.200	1.67E-04	6.56E-01
1310-58-3	Potassium hydroxide	2	II	C	11	6.707	1.05E-03	2.20E+01
1310-73-2	Sodium hydroxide	2	III	C	33	20	3.12E-03	6.51E+01
1313-13-9	Manganese Dioxide (as manganese)	0.2	II	D	1.006	0.671	9.42E-05	2.20E+00
1313-99-0	Nickel Monoxide (as nickel, soluble cmpd)	0.1	I	D	0.357	0.238	3.34E-05	7.81E-01
1314-06-3	Nickel Peroxide (as nickel, soluble cmpd)	0.1	I	D	0.357	0.238	3.34E-05	7.81E-01
1314-13-2	Zinc oxide fume	5	II	D	25	17	2.35E-03	5.50E+01
1314-13-2	Zinc oxide dust	10	II	D	50	34	4.71E-03	1.10E+02
1314-61-0	Tantalum, as Ta dust	5	III	D	74	50	6.97E-03	1.63E+02
1314-62-1	Vanadium pentoxide	0.05	I	D	0.179	0.119	1.67E-05	3.91E-01
1314-80-3	Phosphorus pentasulfide	1	II	D	5.030	3.353	4.71E-04	1.10E+01

Table 1450-1

CAS Number	Description	OEL (mg/m^3)	Toxicity Class[A]	Time Category[B]	24-Hr AAL ($\mu g/m^3$)	Annual AAL ($\mu g/m^3$)	24-Hr Deminimus[C] (lb/hr)	Annual Deminimus (lb/yr)
1317-36-8	Lead Monoxide (as lead)	0.05	I	D	0.179	0.119	1.67E-05	3.91E-01
1317-39-1	Copper (I) Oxide (as copper, dust/mists)	1	I	D	3.571	2.381	3.34E-04	7.81E+00
1317-65-3	Calcium carbonate	10	III	D	149	99	1.39E-02	3.25E+02
1317-95-9	Tripoli	0.1	II	D	0.503	0.335	4.71E-05	1.10E+00
1319-77-3	Cresol	22	II	D	111	74	1.04E-02	2.42E+02
1321-64-8	Pentachloronaphthalene	0.5	II	D	2.515	1.677	2.35E-04	5.50E+00
1321-65-9	Trichloronaphthalene	5	II	D	25	17	2.35E-03	5.50E+01
1321-74-0	Divinyl benzene	53	III	A	2208	526	2.07E-01	1.73E+03
1330-20-7	Xylene	434	I	D	1550	1033	1.45E-01	3.39E+03
1332-58-7	Kaolin	2	II	D	10	6.707	9.42E-04	2.20E+01
1333-82-0	Chromium (VI) Oxide (1:3) (as CrVI, insol.)	0.01	I	D	0.036	0.024	3.34E-06	7.81E-02
1333-86-4	Carbon black	3.5	III	D	52	35	4.88E-03	1.14E+02
1335-87-1	Hexachloronaphthalene	0.2	III	D	2.976	1.984	2.79E-04	6.51E+00
1335-88-2	Tetrachloronaphthalene	2	II	D	10	6.707	9.42E-04	2.20E+01
1336-36-3	Polychlorinated Biphenyls (Aroclors)		I	D	0.100	0.100	9.36E-06	3.28E-01
1338-23-4	Methyl ethyl ketone peroxide	1.5	I	D	5.357	3.571	5.02E-04	1.17E+01
1344-28-1	Aluminum oxide	10	III	D	149	99	1.39E-02	3.25E+02
1344-95-2	Calcium silicate	10	III	A	417	99	3.90E-02	3.25E+02
1395-21-7	Subtilisins (Proteolytic enzymes)	0.00006	II	D	0.001	0.001	2.83E-08	6.60E-04
1477-55-0	m-Xylene a,a'-diamine	0.1	III	C	1.667	0.992	1.56E-04	3.25E+00
1563-66-2	Carbofuran	0.1	I	D	0.357	0.238	3.34E-05	7.81E-01
1582-09-8	Trifluraline		I	D	4.550	4.550	4.26E-04	1.49E+01
1634-04-4	Methyl-tert butyl ether	144	II	D	3000	3000	2.81E-01	9.84E+03
1746-01-6	2,3,7,8-Tetrachlorodibenzo-p-Dioxin		I	D	0.001	0.001		**
1910-42-5	Paraquat Dichloride, respirable fraction	0.1	I	D	0.357	0.238	3.34E-05	7.81E-01

Table 1450-1

CAS Number	Description	OEL (mg/m^3)	Toxicity Class[A]	Time Category[B]	24-Hr AAL ($\mu g/m^3$)	Annual AAL ($\mu g/m^3$)	24-Hr Deminimus[C] (lb/hr)	Annual Deminimus (lb/yr)
1910-42-5	Paraquat Dichloride, total dust	0.5	I	D	1.786	1.190	1.67E-04	3.91E+00
1912-24-9	Atrazine	5	I	D	18	12	1.67E-03	3.91E+01
1918-02-1	Picloram	10	II	D	50	34	4.71E-03	1.10E+02
1929-82-4	Nitrapyrin	10	I	B	50	24	4.68E-03	7.81E+01
2039-87-4	o-Chlorostyrene	283	III	D	4211	2808	3.94E-01	9.21E+03
2074-50-2	Paraquat Dimethyl Sulfate, total dust	0.5	I	D	1.786	1.190	1.67E-04	3.91E+00
2074-50-2	Paraquat Dimethyl Sulfate, resp. fraction	0.1	I	D	0.357	0.238	3.34E-05	7.81E-01
2104-64-5	EPN	0.1	I	D	0.357	0.238	3.34E-05	7.81E-01
2179-59-1	Allyl propyl disulfide	12	III	A	500	119	4.68E-02	3.91E+02
2234-13-1	Octachloronaphthalene	0.1	III	D	1.488	0.992	1.39E-04	3.25E+00
2238-07-5	Diglycidyl ether (DGE)	0.53	I	D	1.893	1.262	1.77E-04	4.14E+00
2425-06-1	Captafol	0.1	I	D	0.357	0.238	3.34E-05	7.81E-01
2426-08-6	n-Butyl glycidyl ether	133	I	D	475	317	4.45E-02	1.04E+03
2451-62-9	1,3,5-Triglycidyl-s-triazinetrione	0.05	I	D	0.179	0.119	1.67E-05	3.91E-01
2528-36-1	Dibutyl phenyl phosphate	3.5	II	D	18	12	1.65E-03	3.85E+01
2551-62-4	Sulfur hexafluoride	5970	III	D	88839	59226	8.32E+00	1.94E+05
2698-41-1	o-Chlorobenzylidene malononitrile	0.39	I	C	1.560	0.929	1.46E-04	3.05E+00
2699-79-8	Sulfuryl fluoride	21	I	D	75	50	7.02E-03	1.64E+02
2764-72-9	Diquat	0.5	I	D	1.786	1.190	1.67E-04	3.91E+00
2921-88-2	Chlorpyrifos	0.2	I	D	0.714	0.476	6.69E-05	1.56E+00
2971-90-6	Clopidol	10	III	D	149	99	1.39E-02	3.25E+02
3333-52-6	Tetramethyl succinonitrile	2.8	I	D	10	6.667	9.36E-04	2.19E+01
3383-96-8	Temephos	10	II	D	50	34	4.71E-03	1.10E+02
3689-24-5	Sulfotep	0.2	I	D	0.714	0.476	6.69E-05	1.56E+00
3825-26-1	Ammonium perfluorooctanoate	0.01	I	B	0.050	0.024	4.68E-06	7.81E-02

Table 1450-1

CAS Number	Description	OEL (mg/m^3)	Toxicity Class[A]	Time Category[B]	24-Hr AAL ($\mu g/m^3$)	Annual AAL ($\mu g/m^3$)	24-Hr Deminimus[C] (lb/hr)	Annual Deminimus (lb/yr)
4016-14-2	Isopropyl glycidyl ether (IGE)	238	II	D	1197	798	1.12E-01	2.62E+03
4098-71-9	Isophorone diisocyanate	0.045	I	D	0.161	0.107	1.50E-05	3.52E-01
4170-30-3	Crotonaldehyde	0.86	I	D	3.071	2.048	2.88E-04	6.72E+00
4685-14-7	Paraquat, respirable fraction	0.1	I	D	0.357	0.238	3.34E-05	7.81E-01
4685-14-7	Paraquat, total dust	0.5	I	D	1.786	1.190	1.67E-04	3.91E+00
5124-30-1	Methylene (4-cyclohexylisocyanate)	0.054	III	D	0.804	0.536	7.52E-05	1.76E+00
5714-22-7	Sulfur pentafluoride	0.1	I	C	0.400	0.238	3.75E-05	7.81E-01
6423-43-4	Propylene glycol dinitrate	0.34	II	D	1.710	1.140	1.60E-04	3.74E+00
6923-22-4	Monocrotophos	0.25	I	D	0.893	0.595	8.36E-05	1.95E+00
7085-85-0	Ethyl cyanoacrylate	1	III	A	42	9.921	3.90E-03	3.25E+01
7429-90-5	Pyro Powders, as Al	5	II	D	25	17	2.35E-03	5.50E+01
7429-90-5	Soluable Salts, as Al	2	II	D	10	6.707	9.42E-04	2.20E+01
7429-90-5	Welding Fumes, as Al	5	II	D	25	17	2.35E-03	5.50E+01
7429-90-5	Alkyls, as Al	2	II	D	10	6.707	9.42E-04	2.20E+01
7429-90-5	Aluminum (dust)	10	II	D	50	34	4.71E-03	1.10E+02
7439-92-1	Lead, elemental & inorganic cmpds.	0.05	I	D	0.179	0.119	1.67E-05	3.91E-01
7439-96-5	Manganese, elemental & inorganic cmpds.	0.2	II	D	1.006	0.050	9.42E-05	1.64E-01
7439-97-6	Mercury, alkyl cmpds.	0.01	I	D	0.300	0.300	2.81E-05	9.84E-01
7439-97-6	Mercury aryl cmpds.	0.1	I	D	0.357	0.300	3.34E-05	9.84E-01
7439-97-6	Mercury, inorganic forms incl. metallic	0.025	I	D	0.300	0.300	2.81E-05	9.84E-01
7439-98-7	Molybdenum, soluble cmpds.	5	I	D	18	12	1.67E-03	3.91E+01
7439-98-7	Molybdenum, insoluble cmpds.	10	I	D	36	24	3.34E-03	7.81E+01
7440-02-0	Nickel Sulfide Roasting (Fume + Dust)	1	I	D	3.571	2.381	3.34E-04	7.81E+00
7440-02-0	Nickel, soluble cmpds. as Ni	0.1	I	D	0.357	0.238	3.34E-05	7.81E-01
7440-02-0	Nickel, metal	1	I	D	3.571	2.381	3.34E-04	7.81E+00

Table 1450-1

CAS Number	Description	OEL (mg/m^3)	Toxicity Class[A]	Time Category[B]	24-Hr AAL ($\mu g/m^3$)	Annual AAL ($\mu g/m^3$)	24-Hr Deminimus[C] (lb/hr)	Annual Deminimus (lb/yr)
7440 - 02 - 0	Nickel, insoluble cmpds. as Ni	1	I	D	3.571	2.381	3.34E-04	7.81E+00
7440 - 06 - 4	Platinum, soluble salts	0.002	II	D	0.010	0.007	9.42E-07	2.20E-02
7440 - 06 - 4	Platinum, metal	1	II	D	5.030	3.353	4.71E-04	1.10E+01
7440 - 16 - 6	Rhodium, soluble cmpds.	0.01	II	D	0.050	0.034	4.71E-06	1.10E-01
7440 - 16 - 6	Rhodium, insoluble cmpds.	1	III	A	42	9.921	3.90E-03	3.25E+01
7440 - 16 - 6	Rhodium, metal	1	III	A	42	9.921	3.90E-03	3.25E+01
7440 - 21 - 3	Silicon	10	III	D	149	99	1.39E-02	3.25E+02
7440 - 22 - 4	Silver, metal	0.1	II	D	0.503	0.335	4.71E-05	1.10E+00
7440 - 22 - 4	Silver, soluble cmpds.	0.01	II	D	0.050	0.034	4.71E-06	1.10E-01
7440 - 25 - 7	Tantalum, metal and oxide	5	III	D	74	50	6.97E-03	1.63E+02
7440 - 28 - 0	Thallium, elemental and soluble cmpds.	0.1	I	D	0.357	0.238	3.34E-05	7.81E-01
7440 - 31 - 5	Tin, oxide/inorg. cmpds.(not- SnH4, as Sn)	2	II	D	10	6.707	9.42E-04	2.20E+01
7440 - 31 - 5	Tin, organic cmpds.	0.1	I	D	0.357	0.238	3.34E-05	7.81E-01
7440 - 31 - 5	Tin, metal	2	II	D	10	6.707	9.42E-04	2.20E+01
7440 - 33 - 7	Tungsten, soluble cmpds.	1	I	B	5	2.381	4.68E-04	7.81E+00
7440 - 33 - 7	Tungsten, Insoluble cmpds.	5	I	D	18	12	1.67E-03	3.91E+01
7440 - 36 - 0	Antimony	0.5	I	D	1.786	1.190	1.67E-04	3.91E+00
7440 - 38 - 2	Arsenic	0.01	I	D	0.036	0.024	3.34E-06	7.81E-02
7440 - 39 - 3	Barium	0.5	II	D	2.515	1.677	2.35E-04	5.50E+00
7440 - 41 - 7	Beryllium and cmpds (as Be)	0.002	I	D	0.02	0.02	1.87E-06	6.56E-02
7440 - 43 - 9	Cadmium	0.01	I	D	0.036	0.024	3.34E-06	7.81E-02
7440 - 47 - 3	Chromium, water soluble	0.05	I	D	0.179	0.119	1.67E-05	3.91E-01
7440 - 47 - 3	Chromium, metal	0.5	I	D	1.786	1.190	1.67E-04	3.91E+00
7440 - 47 - 3	Chromium, insoluble	0.01	I	D	0.036	0.024	3.34E-06	7.81E-02
7440 - 48 - 4	Colbalt, elemental & inorganic cmpds.	0.02	I	D	0.071	0.048	6.69E-06	1.56E-01

Table 1450-1

CAS Number	Description	OEL (mg/m^3)	Toxicity Class[A]	Time Category[B]	24-Hr AAL ($\mu g/m^3$)	Annual AAL ($\mu g/m^3$)	24-Hr Deminimus[C] (lb/hr)	Annual Deminimus (lb/yr)
7440-50-8	Copper, dusts and mists	1	I	D	3.571	2.381	3.34E-04	7.81E+00
7440-50-8	Copper, fume	0.2	I	D	0.714	0.476	6.69E-05	1.56E+00
7440-58-6	Hafnium	0.5	III	D	7.440	4.960	6.97E-04	1.63E+01
7440-61-1	Uranium (natural) soluble & insoluble	0.2	I	D	0.714	0.476	6.69E-05	1.56E+00
7440-65-5	Yttrium, metal & cmpds.	1	III	D	15	9.921	1.39E-03	3.25E+01
7440-66-6	Zinc (as zinc oxide, fume)	5	II	D	25	17	2.35E-03	5.50E+01
7440-66-6	Zinc (as zinc oxide dust)	10	II	D	50	34	4.71E-03	1.10E+02
7440-67-7	Zirconium and cmpds.	5	III	D	74	50	6.97E-03	1.63E+02
7440-74-6	Indium	0.1	I	D	0.357	0.238	3.34E-05	7.81E-01
7550-45-0	Titanium Tetrachloride							**
7553-56-2	Iodine	1	I	D	3.571	2.381	3.34E-04	7.81E+00
7572-29-4	Dichloroacetylene	0.39	I	D	1.393	0.929	1.30E-04	3.05E+00
7580-67-8	Lithium hydride	0.025	III	B	0.521	0.248	4.88E-05	8.14E-01
7616-94-6	Perchloryl fluoride	13	II	D	65	44	6.12E-03	1.43E+02
7631-86-9	Silica, Amorphous, Fumed	2	II	D	10	6.707	9.42E-04	2.20E+01
7631-90-5	Sodium bisulfite	5	II	D	25	17	2.35E-03	5.50E+01
7637-07-2	Boron trifluoride	2.8	I	C	11	6.667	1.05E-03	2.19E+01
7646-85-7	Zinc chloride fume	1	I	D	3.571	2.381	3.34E-04	7.81E+00
7647-01-0	Hydrogen chloride	7.5	I	D	27	20	2.51E-03	6.56E+01
7664-38-2	Phosphoric acid	1	III	D	15	10	1.39E-03	3.28E+01
7664-39-3	Hydrogen fluoride	2.3	I	D	8.214	5.476	7.69E-04	1.80E+01
7664-41-7	Ammonia	17	II	D	100	100	9.36E-03	3.28E+02
7664-93-9	Sulfuric Acid	1	I	D	3.571	2.381	3.34E-04	7.81E+00
7681-49-4	Sodium Fluoride (as fluoride)	2.5	I	D	8.929	5.952	8.36E-04	1.95E+01
7681-57-4	Sodium metabisulfite	5	II	B	35	17	3.30E-03	5.50E+01

Table 1450-1

CAS Number	Description	OEL (mg/m^3)	Toxicity Class[A]	Time Category[B]	24-Hr AAL ($\mu g/m^3$)	Annual AAL ($\mu g/m^3$)	24-Hr Deminimus[C] (lb/hr)	Annual Deminimus (lb/yr)
7697-37-2	Nitric acid	5.2	I	D	19	12	1.74E-03	4.06E+01
7705-08-0	Ferric Chloride (as iron, soluble salt)	1	II	D	5.030	3.353	4.71E-04	1.10E+01
7719-09-7	Thionyl chloride	4.9	I	C	20	12	1.84E-03	3.83E+01
7719-12-2	Phosphorus trichloride	1.1	I	D	3.929	2.619	3.68E-04	8.59E+00
7722-64-7	Potassium Permanganate (as manganese)	0.2	II	D	1.006	0.671	9.42E-05	2.20E+00
7722-84-1	Hydrogen peroxide	1.4	II	B	9.859	4.695	9.23E-04	1.54E+01
7722-88-5	Tetrasodium pyrophosphate	5	III	B	104	50	9.75E-03	1.63E+02
7723-14-0	Phosphorus (yellow)	0.1	I	D	0.357	0.238	3.34E-05	7.81E-01
7726-95-6	Bromine	0.66	II	D	3.320	2.213	3.11E-04	7.26E+00
7727-21-1	Persulfate, Potassium	0.1	III	B	2.083	0.992	1.95E-04	3.25E+00
7727-43-7	Barium sulfate	10	III	A	417	99	3.90E-02	3.25E+02
7727-54-0	Persulfate, Ammonium	0.1	III	B	2.083	0.992	1.95E-04	3.25E+00
7758-94-3	Ferrous Chloride (as iron, soluble salt)	1	II	D	5.030	3.353	4.71E-04	1.10E+01
7758-97-6	Lead chromate (TLV for Cr)	0.012	I	D	0.043	0.029	4.01E-06	9.37E-02
7773-06-0	Ammonium sulfamate	10	III	D	149	99	1.39E-02	3.25E+02
7775-27-1	Persulfate, Sodium	0.1	III	B	2.083	0.992	1.95E-04	3.25E+00
7778-18-9	Calcium sulfate	10	III	D	149	99	1.39E-02	3.25E+02
7782-41-4	Fluorine	1.6	I	D	5.714	3.810	5.35E-04	1.25E+01
7782-42-5	Graphite (all forms except graphite fibers)	2	II	A	28	6.707	2.64E-03	2.20E+01
7782-49-2	Selenium	0.2	I	D	0.714	0.476	6.69E-05	1.56E+00
7782-50-5	Chlorine	1.5	II	D	7.545	5.030	7.06E-04	1.65E+01
7782-65-2	Germanium tetrahydride	0.63	II	B	4.437	2.113	4.15E-04	6.93E+00
7783-06-4	Hydrogen sulfide	14	II	D	70	1	6.59E-03	3.28E+00
7783-07-5	Hydrogen selenide	0.16	I	D	0.571	0.381	5.35E-05	1.25E+00
7783-41-7	Oxygen difluoride	0.11	I	D	0.393	0.262	3.68E-05	8.59E-01

Table 1450-1

CAS Number	Description	OEL (mg/m^3)	Toxicity Class[A]	Time Category[B]	24-Hr AAL ($\mu g/m^3$)	Annual AAL ($\mu g/m^3$)	24-Hr Deminimus[C] (lb/hr)	Annual Deminimus (lb/yr)
7783-54-2	Nitrogen trifluoride	29	II	D	146	97	1.37E-02	3.19E+02
7783-60-0	Sulfur tetrafluoride	0.44	I	C	1.760	1.048	1.65E-04	3.44E+00
7783-79-1	Selenium hexafluoride	0.16	I	D	0.571	0.381	5.35E-05	1.25E+00
7783-80-4	Tellurium hexafluoride	0.1	I	D	0.357	0.238	3.34E-05	7.81E-01
7784-40-9	Lead arsenate	0.15	I	D	0.536	0.357	5.02E-05	1.17E+00
7784-42-1	Arsine	0.16	I	D	0.571	0.050	5.35E-05	1.64E-01
7786-34-7	Mevinphos	0.092	I	D	0.329	0.219	3.08E-05	7.19E-01
7786-81-4	Nickel Sulfate (as nickel, soluble cmpds)	0.1	I	D	0.357	0.238	3.34E-05	7.81E-01
7789-06-2	Strontium chromate	0.0005	I	D	0.002	0.001	1.67E-07	3.91E-03
7789-30-2	Bromine pentafluoride	0.72	III	D	11	7.143	1.00E-03	2.34E+01
7790-91-2	Chlorine trifluoride	0.38	I	C	1.520	0.905	1.42E-04	2.97E+00
7803-51-2	Phosphine	0.42	I	D	1.500	0.300	1.40E-04	9.84E-01
7803-52-3	Stibine	0.51	I	D	1.821	1.214	1.71E-04	3.98E+00
7803-62-5	Silicon tetrahydride	6.6	III	B	138	65	1.29E-02	2.15E+02
8001-35-2	Chlorinated camphene	0.5	I	D	1.786	1.190	1.67E-04	3.91E+00
8002-05-9	Petroleum Distillate	2000	I	B	10000	4762	9.36E-01	1.56E+04
8002-74-2	Paraffin wax fume	2	III	A	83	20	7.80E-03	6.51E+01
8003-34-7	Pyrethrum	5	I	D	18	12	1.67E-03	3.91E+01
8006-61-9	Gasoline	890	II	D	4477	2985	4.19E-01	9.79E+03
8006-64-2	Turpentine	556	II	B	3915	1865	3.67E-01	6.12E+03
8008-20-6	Kerosene	100	II	D	503	335	4.71E-02	1.10E+03
8012-95-1	Oil Mist, Mineral	5	II	D	25	17	2.35E-03	5.50E+01
8022-00-2	Methyl demeton	0.5	I	D	1.786	1.190	1.67E-04	3.91E+00
8030-30-6	Rubber solvent (Naphtha)	1590	II	D	7998	5332	7.49E-01	1.75E+04
8032-32-4	VM & P Naptha	1370	I	B	6850	3262	6.41E-01	1.07E+04

Table 1450-1

CAS Number	Description	OEL (mg/m^3)	Toxicity Class[A]	Time Category[B]	24-Hr AAL (g/m^3)	Annual AAL (g/m^3)	24-Hr Deminimus[C] (lb/hr)	Annual Deminimus (lb/yr)
8050-09-7	Rosin core solder thermal decomp. prod.	0.1	II	D	0.503	0.335	4.71E-05	1.10E+00
8052-41-3	Stoddard solvent	525	II	D	2641	1761	2.47E-01	5.78E+03
8052-42-4	Asphalt (petroleum) fumes	5	II	D	25	17	2.35E-03	5.50E+01
8065-48-3	Demeton	0.11	I	D	0.393	0.262	3.68E-05	8.59E-01
9002-86-2	Polyvinyl Chloride	6	II	D	30	20	2.83E-03	6.60E+01
9004-34-6	Cellulose	10	III	D	149	99	1.39E-02	3.25E+02
9005-25-8	Starch	10	III	D	149	99	1.39E-02	3.25E+02
9005-25-9	Starch (dust)	10	III	D	149	99	1.39E-02	3.25E+02
9014-01-1	Subtilisins (100% pure crystalline enzyme)	0.00006	II	D	0.001	0.001	2.83E-08	6.60E-04
10024-97-2	Nitrous oxide	90	I	D	321	214	3.01E-02	7.03E+02
10025-67-9	Sulfur monochloride	5.5	I	C	22	13	2.06E-03	4.30E+01
10025-87-3	Phosphorus oxychloride	0.63	I	D	2.250	1.500	2.11E-04	4.92E+00
10026-13-8	Phosphorus pentachloride	0.85	I	D	3.036	2.024	2.84E-04	6.64E+00
10035-10-6	Hydrogen bromide	9.9	II	C	56	33	5.22E-03	1.09E+02
10049-04-4	Chlorine dioxide	0.28	II	D	1.408	0.200	1.32E-04	6.56E-01
10102-43-9	Nitric oxide	31	II	D	156	104	1.46E-02	3.41E+02
10210-68-1	Cobalt carbonyl	0.1	II	D	0.503	0.335	4.71E-05	1.10E+00
10294-33-4	Boron tribromide	10	III	D	149	99	1.39E-02	3.25E+02
10588-01-9	Sodium Dichromate (as Chromium)	0.05	I	D	0.179	0.119	1.67E-05	3.91E-01
11097-69-1	Chlorodiphenyl (54% chlorine)	0.5	I	D	1.786	1.190	1.67E-04	3.91E+00
11103-86-9	Zinc chromates	0.01	I	D	0.036	0.024	3.34E-06	7.81E-02
11292-00-8	Silica gel	10	II	D	50	34	4.71E-03	1.10E+02
12001-26-2	Mica	3	II	D	15	10	1.41E-03	3.30E+01
12035-72-2	Nickel subsulfide (as Ni)	0.1	I	D	0.357	0.238	3.34E-05	7.81E-01
12079-65-1	Manganese cyclopentadienyl tricarbonyl	0.1	I	D	0.357	0.238	3.34E-05	7.81E-01

Table 1450-1

CAS Number	Description	OEL (mg/m^3)	Toxicity Class[A]	Time Category[B]	24-Hr AAL ($\mu g/m^3$)	Annual AAL ($\mu g/m^3$)	24-Hr Deminimus[C] (lb/hr)	Annual Deminimus (lb/yr)
12108-13-3	2-Methylcyclopentadienyl, Mn tricarbonyl	0.2	I	D	0.714	0.476	6.69E-05	1.56E+00
12125-02-9	Ammonium chloride fume	10	III	A	417	99	3.90E-02	3.25E+02
12415-34-8	Emery	10	III	D	149	99	1.39E-02	3.25E+02
12604-58-9	Ferrovanadium dust	1	III	A	42	9.921	3.90E-03	3.25E+01
12656-85-8	Molybdate Orange (as Molybdenum, soluble)	5	I	D	18	12	1.67E-03	3.91E+01
13121-70-5	Cyhexatin	5	I	D	18	12	1.67E-03	3.91E+01
13397-24-5	Gypsum (as Calcium Sulfate by ACGIH)	10	III	D	149	99	1.39E-02	3.25E+02
13463-39-3	Nickel carbonyl	0.12	I	D	0.429	0.286	4.01E-05	9.37E-01
13463-40-6	Iron pentacarbonyl	0.23	I	B	1.150	0.548	1.08E-04	1.80E+00
13463-67-7	Titanium dioxide	10	II	D	50	34	4.71E-03	1.10E+02
13494-80-9	Tellurium, as Te	0.1	I	D	0.357	0.238	3.34E-05	7.81E-01
13530-65-9	Zinc chromate	0.01	I	D	0.036	0.024	3.34E-06	7.81E-02
13765-19-0	Calcium chromate	0.001	I	D	0.004	0.002	3.34E-07	7.81E-03
13770-89-3	Nickel (II) Sulfamate (as Nickel, soluble)	0.1	I	D	0.357	0.238	3.34E-05	7.81E-01
13838-16-9	Enflurane	566	I	D	2021	1348	1.89E-01	4.42E+03
14464-46-1	Cristobalite	0.05	II	D	0.252	0.168	2.35E-05	5.50E-01
14484-64-1	Ferbam	10	II	D	50	34	4.71E-03	1.10E+02
14807-96-6	Talc (containing no asbestos fibers)	2	II	D	10	6.707	9.42E-04	2.20E+01
14807-96-6	Talc (containing asbestos fibers)	0.2	I	D	0.714	0.476	6.69E-05	1.56E+00
14808-60-7	Quartz	0.1	II	D	0.503	0.335	4.71E-05	1.10E+00
14857-34-2	Dimethylethoxysilane	2.1	II	D	11	7.042	9.89E-04	2.31E+01
14977-61-8	Chromyl chloride	0.16	II	D	0.805	0.537	7.54E-05	1.76E+00
15468-32-3	Tridymite	0.05	II	D	0.252	0.168	2.35E-05	5.50E-01
16219-75-3	Ethylidene norbornene	25	I	D	89	60	8.36E-03	1.95E+02
16752-77-5	Methomyl	2.5	I	D	8.929	5.952	8.36E-04	1.95E+01

Table 1450-1

CAS Number	Description	OEL (mg/m^3)	Toxicity Class[A]	Time Category[B]	24-Hr AAL ($\mu g/m^3$)	Annual AAL ($\mu g/m^3$)	24-Hr Deminimus[C] (lb/hr)	Annual Deminimus (lb/yr)
16842-03-8	Cobalt hydrocarbonyl	0.1	I	B	0.500	0.238	4.68E-05	7.81E-01
17702-41-9	Decaborane	0.25	I	D	0.893	0.595	8.36E-05	1.95E+00
17804-35-2	Benomyl	10	I	D	36	24	3.34E-03	7.81E+01
19287-45-7	Diborane	0.11	I	D	0.393	0.262	3.68E-05	8.59E-01
19624-22-7	Pentaborane	0.013	I	D	0.046	0.031	4.35E-06	1.02E-01
20816-12-0	Osmium tetroxide	0.0016	II	B	0.011	0.005	1.05E-06	1.76E-02
21087-64-9	Metribuzin	5	I	D	18	12	1.67E-03	3.91E+01
21351-79-1	Cesium hydroxide	2	III	B	42	20	3.90E-03	6.51E+01
22224-92-6	Fenamiphos	0.1	I	D	0.357	0.238	3.34E-05	7.81E-01
25013-15-4	Vinyl toluene	242	II	D	1217	812	1.14E-01	2.66E+03
25321-14-6	Dinitrotoluene	0.2	I	D	0.714	0.476	6.69E-05	1.56E+00
25551-13-7	Trimethyl benzene	123	II	D	619	412	5.79E-02	1.35E+03
25639-42-3	Methylcyclohexanol	234	III	D	3482	2321	3.26E-01	7.62E+03
26140-60-3	Terphenyls	5	II	D	25	17	2.35E-03	5.50E+01
26471-62-5	Toluene-1,3-Diisocyanate (as TDI)	0.036	I	D	0.129	0.070	1.20E-05	2.30E-01
26499-65-0	Plaster of Paris (as Ca Sulfate by ACGIH)	10	III	D	149	99	1.39E-02	3.25E+02
26628-22-8	Sodium azide	0.29	I	D	1.036	0.690	9.70E-05	2.27E+00
26628-22-8	Sodium azide, as Hydrazoic acid vapor	0.11	I	D	0.393	0.262	3.68E-05	8.59E-01
26952-21-6	Isooctyl alcohol	266	III	B	5542	2639	5.19E-01	8.66E+03
31242-93-0	Chlorinated diphenyl oxide	0.5	III	D	7.440	4.960	6.97E-04	1.63E+01
34590-94-8	Dipropylene glycol methyl ether	606	II	D	3048	2032	2.85E-01	6.67E+03
35400-43-2	Sulprofos	1	I	D	3.571	2.381	3.34E-04	7.81E+00
37300-23-5	Zinc chromates	0.01	I	D	0.036	0.024	3.34E-06	7.81E-02
53469-21-9	Chlorodiphenyl (42% chlorine)	1	I	D	3.571	2.381	3.34E-04	7.81E+00
55720-99-5	Chlorinated diphenyl oxide	0.5	III	D	7.440	4.960	6.97E-04	1.63E+01

Table 1450-1

CAS Number	Description	OEL (mg/m^3)	Toxicity Class[A]	Time Category[B]	24-Hr AAL ($\mu g/m^3$)	Annual AAL ($\mu g/m^3$)	24-Hr Deminimus[C] (lb/hr)	Annual Deminimus (lb/yr)
60676-86-0	Silica, fused	0.1	II	D	0.503	0.335	4.71E-05	1.10E+00
61788-32-7	Hydrogenated terphenyls	4.9	III	D	73	49	6.83E-03	1.59E+02
61790-53-2	Diatomaceous earth, inhalable particulate	10	II	D	50	34	4.71E-03	1.10E+02
61790-53-2	Diatomaceous earth, respirable particulate	3	II	D	15	10	1.41E-03	3.30E+01
65996-93-2	Coal tar pitch volatiles	0.2	I	D	0.714	0.476	6.69E-05	1.56E+00
65997-15-1	Portland cement	10	III	A	417	99	3.90E-02	3.25E+02
68476-85-7	Liquified petroleum gas (LPG)	1800	III	B	37500	17857	3.51E+00	5.86E+04
69012-64-2	Silica, fume	2	II	D	10	6.707	9.42E-04	2.20E+01
74222-97-2	Sulfometuron methyl	5	II	D	25	17	2.35E-03	5.50E+01
93763-70-3	Perlite	10	III	D	149	99	1.39E-02	3.25E+02
112926-00-8	Precipitated silica	10	II	D	50	34	4.71E-03	1.10E+02

Table 1450-1 CAS Number	Description	OEL (mg/m^3)	Toxicity Class[A]	Time Category[B]	24-Hr AAL ($\mu g/m^3$)	Annual AAL ($\mu g/m^3$)	24-Hr Deminimus[C] (lb/hr)	Annual Deminimus (lb/yr)

Footnotes:

[A] **Toxicity Classification as classified in Env-A 1407, in general:**
Toxicity Class I: Classification established pursuant to Env-A 1407.02.
Toxicity Class II: Classification established pursuant to Env-A 1407.03.
Toxicity Class III: Classification established pursuant to Env-A 1407.04.

[B] **Criteria for time adjustment factors as set-forth in Env-A 1409.02, in general:**
Time Adjustment Factor A: Those regulated toxic air pollutants that have an occupational exposure limit (OEL) which is intended to primarily prevent irritation or discomfort, or for which there are essentially no known cumulative effects resulting from extended exposures to such pollutants at concentration levels at or near the OEL.
Time Adjustment Factor B: Those regulated toxic air pollutants that have an OEL which is intended to prevent acute exposure effects.
Time Adjustment Factor C. Those regulated toxic air pollutants that have a ceiling limit value set as an OEL which was not intended to be exceeded at any time.
Time Adjustment Factor D: Those regulated toxic air pollutants that have an OEL which is set either by technological feasibility or commonly recognized good hygiene practice, or which present cumulative health hazards and have an OEL intended to prevent excessive accumulation in the body from extended periods of exposure, or which present both acute and cumulative health hazards.

[C] De minimus values were calculated using non-rounded ambient air limits. The ambient air values represented in this table are rounded to the nearest third decimal place.

* f/cc: Fibers/cubic centimeter of sampled air.
** Denotes regulated toxic air pollutants which have data limitations preventing derivation of ambient air limits in accordance with Env-A 1411.

Source. #6739-B, eff 5-8-98; amd by #7345, eff 9-22-00

Appendix G:
List of Hazardous Air Pollutants

The Hazardous Air Pollutants from the 1990 Clean Air Act Amendments are listed below. Those that may be used in some printing processes are in **bold** type.

Acetaldehyde
Acetamide
Acetonitrile
Acetophenone
2-Acetylaminofluorene
Acrolein
Acrylamide
Acrylic Acid
Acrylonitrile
Allyl chloride
4-Aminobiphenyl
Aniline
o-Anisidine
Asbestos
Benzene (including benzene from gasoline)
Benzidine
Benzotrichloride
Benzyl chloride
Biphenyl
Bis (2-ethylhexyl) phthalate (DEHP)
Bis (chloromethyl) ether
Bromoform
1,3-Butadiene
Calcium cyanamide
Captan
Carbaryl
Carbon disulfide
Carbon tetrachloride
Carbonyl sulfide
Catechol
Chloramben
Chlordane
Chlorine
Chloroacetic acid
2-Chloroacetophenone
Chlorobenzene
Chlorobenzilate
Chloroform
Chloromethyl methyl ether
Chloroprene
Cresols/cresylic acid (isomers and mixture)
o-Cresol
m-Cresol
p-Cresol
Cumene
2,4-D, salts and esters
DDE
Diazomethane
Dibenzofurans
1,2-Dibromo-3-chloropropane
Dibutylphthalate
1,4-Dichlorobenzene(p)
3,3-Dichlorobenzidene
Dichloroethyl ether (Bis(2-chloroethyl)ether)
1,3-Dichloropropene
Dichlorvos
Diethanolamine
N,N-diethyl aniline (N,N-Dimethylaniline)
Diethyl sulfate
3,3-Dimethoxybenzidine
Dimethyl aminoazobenzene
3,3'-Dimethyl benzidine
Dimethyl carbamoyl chloride
Dimethyl formamide
1,1-Dimethyl hydrazine
Dimethyl phthalate
Dimethyl sulfate
4,6-Dinitro-o-cresol and salts
2,4-Dinitrophenol
2,4-Dinitrotoluene
1,4-Dioxane (1,4-Diethyleneoxide)
1,2-Diphenylhydrazine
Epichlorohydrin (1-Chloro-2,3-epoxypropane)
1,2-Epoxybutane
Ethyl acrylate
Ethyl benzene
Ethyl carbamate (Urethane)
Ethyl chloride (Chloroethane)
Ethylene dibromide (Dibromoethane)
Ethylene dichloride (1,2-Dichloroethane)
Ethylene glycol
Ethylene imine (Aziridine)
Ethylene oxide
Ethylene thiourea
Ethylidene dichloride (1,1-Dichloroethane)
Formaldehyde
Heptachlor
Hexachlorobenzene

Hexachlorobutadiene
Hexachlorocyclopentadiene
Hexachloroethane
Hexamethylene-1,6-diisocyanate
Hexamethylphosphoramide
Hexane
Hydrazine
Hydrochloric acid
Hydrogen fluoride (Hydrofluoric acid)
Hydroquinone
Isophorone
Lindane (all isomers)
Maleic anhydride
Methanol
Methoxychlor
Methyl bromide (Bromomethane)
Methyl chloride (Chloromethane)
Methyl chloroform (1,1,1-Trichloroethane)
Methyl ethyl ketone (2-Butanone)
Methyl hydrazine
Methyl iodide (Iodomethane)
Methyl isobutyl ketone (Hexone)
Methyl isocyanate
Methyl methacrylate
Methyl tert butyl ether
4,4'-Methylene bis (2-Chloroaniline)
Methylene chloride (Dichloromethane)
Methylene diphenyl diisocyanate (MDI)
4,4-Methylenedianiline
Naphthalene
Nitrobenzene
4-Nitrobiphenyl
4-Nitrophenol
2-Nitropropane
N-Nitroso-N-methylurea
N-Nitrosodimethylamine
N-Nitrosomorpholine
Parathion
Pentachloronitrobenzene (Quintobenzene)
Pentachlorophenol
Phenol
p-Phenylenediamine
Phosgene
Phosphine
Phosphorus
Phthalic anhydride
Polychlorinated biphenyls (Aroclors)
1,3-Propane sultone
Beta-propiolactone
Propionaldehyde
Propoxur (Baygon)
Propylene dichloride (1,2-Dichloropropane)
Propylene oxide
1,2-Propylenimine (2-Methyl aziridine)
Quinoline
Quinone
Styrene
Styrene oxide
2,3,7,8-Tetrachlorodibenzo-p-dioxin
1,1,2,2-Tetrachloroethane
Tetrachloroethylene (Perchloroethylene)
Titanium tetrachloride
Toluene
2,4-Toluene diamine
2,4-Toluene diisocyanate
o-Toluidine
Toxaphene (Chlorinated camphene)
1,2,4-Trichlorobenzene
1,1,2-Trichloroethane
Trichloroethylene
2,4,5-Trichlorophenol
2,4,6-Trichlorophenol
Triethylamine
Trifluralin
2,2,4-Trimethylpentane
Vinyl acetate
Vinyl bromide
Vinyl chloride
Vinylidene chloride (1,1-Dichloroethylene)
Xylenes (isomers and mixture)
o-Xylenes
m-Xylenes
p-Xylenes
Antimony compounds
Arsenic compounds (inorganic, including arsine)
Beryllium compounds
Cadmium compounds
Chromium compounds
Cobalt compounds
Coke oven emissions
Cyanide compounds
Glycol ethers
Lead compounds
Manganese compounds
Mercury compounds
Fine mineral fibers
Nickel compounds
Polycyclic organic matter
Radionuclides (including radon)
Seleniu

Appendix H:
Signs and Other Helpful Information


HAZARDOUS
WASTE
STORAGE AREA

ATTENTION

DO NOT PUT HAZARDOUS WASTES AND WASTE INKS DOWN THE DRAIN

SEWER SYSTEM

ATTENTION

DO NOT PUT
PROCESS CHEMICALS
DOWN THE DRAIN

SEPTIC SYSTEM

APPENDIX I:
PrintSTEP Application

PrintSTEP Application

1. Background Information

Reporting year:		
This is a (***circle one***): Initial PrintSTEP Application	or	Annual PrintSTEP Renewal
Your Name:		Phone:
Facility Name:		Fax:
Street Address:		E-mail:
City:		
Number of Employees: Full Time=		Part time=

2. Type of Printing Operations

TYPE OF PRINTING PROCESSES YOU USE	**Check all that apply**	**If you have multiple processes, estimate the percentage of production from each process*:**
Sheetfed Lithography		
Non-heatset Web Lithography		
Heatset Web Lithography		
Flexography		
Screenprinting		
Gravure		
Digital Impressions		

3. Waste Water Information

Refer to Chapter 3 in *Plain Language Workbook*.	Yes	No
Do you discharge any wastewater to a septic system? If so, what do you discharge? _____ _____		
Do you discharge industrial wastewater to a sewer district? If yes, what do you discharge? _____ _____ Do you have an authorization letter or permit from your POTW?		
Do you discharge wastewater directly to surface water? If so, what do you discharge? _____ _____ Do you have an NPDES permit for this discharge?		

If you have a wastewater permit or authorization letter, complete the following information:			
Date Permit Obtained		Permitting Authority:	
Expiration Date:		Permit Number:	
Estimate the amount of waste water discharged over the last 12 mos.			

4. Storm Water Information

Refer to Chapter 4 in the *Workbook*.

	Yes	No
Do your facility meet the "no-exposure" status for wastewater as determined by the checklist on Page X of Chapter 4 in the Workbook?		
Please attach a copy of your checklist.		

5. Hazardous Waste Generation

Refer to Chapter 5 in the *Workbook*.

Do you have an EPA ID Number for hazardous waste generation? **If so, what is it? _____**	
What is your RCRA generator status?	**Check One:**
No hazardous waste generated	
Status is Unknown	
Small Quantity Generator	
Full Quantity Generator <1000kg/month, or 2200#/month	
Full Quantity Generator >1000kg/month, or 2200#/month	

List all industrial wastes generated during the past 12 months; attach additional sheets if necessary.

Name of the Waste	**Waste Type***	**Process or Activity Generating Waste**	**Amount Generated** (lbs or gal)

- If the waste is a listed hazardous waste, enter the RCRA waste code (such as D001), otherwise enter the RCRA characteristic ignitable, corrosive, reactive, or toxic.

6. Air Emissions

Refer to Chapter 6,7, and 8 in the *Workbook*.

What is your VOC Air Level, calculated from Chapter 6?						
	circle one:	1	2	3	4	5
Are you below deminimus levels for each RTAP you use? (see Chapter 7 in the workbook). Yes or No?						
	If YES: proceed to next section.		or	If NO: contact NH DES Air Resources Division.		
	circle one:	1		2		3

7. Public Involvement

Refer to Chapter 11 in the *Workbook*.

How has your facility interacted with your community and immediate neighbors in the past year regarding environmental concerns? (Refer to Chapter 11 in the *Workbook*)	**Check all that apply**
Open House	
Mailings – advertising	
Mailings - non-advertising	
Discussions with Community leaders	
Public Meeting	
No Activity	

8. Technical Assistance

Refer to Appendix A in the *Workbook*.

As a PrintSTEP participant, you will have access to free technical assistance. These specialists can help you with pollution prevention, environmental compliance, or any questions on PrintSTEP. A list of technical assistance contacts is provided in Appendix A. Check here if you would like a technical assistance specialist to contact you: □. Please list any areas you particularly would like assistance with.

_____

_____

_____

_____

9. Production or Activity Indicator

You will report a single number <u>without units</u>. Only you will know the derivation of this number (be it square feet printed, sales, labor hours, etc.). You will keep that information on file for use again in the next reporting cycle, when the next year's number will be compared to the last year's number to see how it has changed.

Please turn to page X for an explanation and directions.
What is your production or activity indicator?_____

Directions for Completing Question #9: Productivity Indicator.

EPA is collecting environmental impact data on this application in order to evaluate the overall pilot PrintSTEP program, which is being carried out in three states. In order to accurately account for changes in environmental emissions or waste during the course of the PrintSTEP program, EPA must be able to determine if a change in emissions/waste is the result of a change in environmental management practices, or if the change is due to increasing or decreasing production. To make this determination possible, facilities must provide: 1) an indicator of current year production; OR 2) an indicator for level of activity based on a variable other than production that is the primary influence on the quantity of material your facility recycles, treats or releases. You may report a number reflecting either production or activity.

While several methods are available for determining this data element, *the production or activity indicator must be based on the variable that most directly affects the quantities of material recycled, treated or released*. Examples of indicators available include the following:

- Square feet of substrate printed this year;
- Number of impressions made this year;
- Total annual sales this year;
- Total annual labor hours this year;
- A different method that you select.

Example 1, using sales:

You determine that annual sales is the best indicator of the quantity of material your facility recycles, treats or releases. Your total annual sales were $500,000 in 2000. You could report an activity indicator of 5.0; 500,000; or something similar that reflects sales but does not include units.

Example 2, using number of impressions:

The variable that most closely reflects the quantity of material the facility recycles, treats or releases is number of impressions, since most of those impressions are similar in terms of size, substrate, and complexity. If your total number of impressions was 104,000 in the current reporting year, you could report a production indicator of 104.

10. Pollution Prevention Information

Refer to Chapter 2 and Appendix B in the *Workbook*.

Pollution Prevention Practice For new PrintSTEP applicants, answer: Have you ever...? For annual renewal of PrintSTEP, answer: Over the last year, have you?	*Check the appropriate column:*				
	Yes	**No**	**Investigating**	**Don't Know**	**N/A**
PREPRESS					
Eliminated chrome based cleaners?					
Installed and properly maintained silver recovery units?					
Used developer and fixer recycling units for film processors?					
Used low replenishing rate film chemistry?					
Used recycling units for film and plate processor washwater?					
Used digital, dry, or water-based proofing systems?					
PRINTING					
Used first-in-first-out inventory system to reduce waste ink disposal costs?					
Switched to low VOC ink systems (e.g., UV curable, water or vegetable-based technology)					
Used stay open inks or cartridge ink delivery system?					
Where possible, used low solvent, or water-based ink jet inks?					
Used chiller re-circulators to reduce evaporation and lower air emissions?					
Switched to isopropyl alcohol free fountain solutions or reduced concentration of isopropyl alcohol in fountain solution?					

Pollution Prevention Practice For new PrintSTEP applicants, answer: Have you ever...? For annual renewal of PrintSTEP, answer: Over the last year, have you?	*Check the appropriate column:*				
	Yes	**No**	**Investigating**	**Don't Know**	**N/A**
Installed filtration system for fountain solution re-circulation system?					
POST-PRESS/ CLEANING/WIPES Switched to low vapor pressure or low VOC cleaning solvents (less than 10 mm Hg) to reduce air emissions and solvent use?					
Replaced hazardous solvents with non-hazardous or less hazardous solvents?					
Instituted a solvent recycling/reuse system?					
Stored soiled wipes in closed or covered containers to reduce air emissions?					
Recover free liquids from shop towels (i.e., gravity draining, wringers, centrifuges, etc.)?					
Where possible, used low solvent, no solvent-based, or water-based adhesives and glues?					
REUSE/ RECYCLING Implemented a solid waste/recycling program to recycle all possible items from your solid waste stream?					
Reused and recycled pallets and skids to reduce solid waste?					
Collected and recycled used oil, other lubricants, and batteries?					
Recycled parts washing fluids?					
Properly Recycled or disposed of spent fluorescent and HID lamps?					
Requested vendor take back all samples not consumed?					
HOUSEKEEPING Covered all open containers of liquids and keep them closed?					
Stored all materials to minimize damage due to mishandling or accidents?					

Confidential Business Information (CBI) Notice:

EPA's regulations on confidential business information (CBI) are found in 40 CFR Part 2, Subpart B. (A copy is available, upon request, from your State PrintSTEP coordinator.) Please identify any information that you claim is confidential business information. If you make a confidentiality claim, and if EPA determines that the information you designated meets the CBI criteria in 40 CFR Section 2.208, we will disclose the information only to the extent, and by means of the procedures, specified in 40 CFR Part 2, Subpart B. If no such claim accompanies the information when it is received by EPA, it may be made available to the public without further notice to the business.

Signature of PrintSTEP Applicant: _____

Printed Name: _____